# chemical processing

- Close control of iodine value
- 12
- · Isosebacic acid has high reactivity

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**Putman Publishing Company** CREATORS OF PUTMAN-STYLE MAGAZINES



WILLIAM C. DABNEY **Pioneer of Progress** in Epoxy Resins ... see page 10



## Now-A Full Line of B&A Radioisotope Reagents

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#### Testing knocks and pings

Du Pont's Petroleum Lab has a fleet of test cars which is designed to assist the oil industry in solving knocking (and pinging) problems. Any car of the fleet, mounted on a chassis dynamometer (a device enabling road tests to be made while the car stands still), can give detailed reports on performance of various gasolines.

In fact, each car carries several small tanks of gas in its trunk . . . for fast switching to a different fuel.

A console-type pushbutton board inside the car controls

#### "What's in a name?"

If old Bill Shakespeare were alive today, he might regret those words. Nomenclature, it seems, is a difficult subject, particularly since man has developed more products and processes than he can properly name.

The problem is such that several large companies have "nomenclature committees" whose job it is to name their company's discoveries. Some companies are merely numbering their products.

The James M. Vicary Company, a marketing research firm, has found that many of these problems can be solved by letting the consumer do the naming.

#### Some light shed upon lightning

Lightning, which kills 400 people each year in this country and sparks 10% of the forest fires, is still not fully understood by scientists. It is generally believed that electrification is caused by the falling of charged precipitation particles. How the particles get charged is still in doubt.

However, Dr. Bernard Vonnegut, a physicist at Arthur D. Little, Inc., has proposed a theory of electrification that is not dependent upon precipitation. He states that the electrification occurs long before the precipitation, and may even play an important part in the formation of rain.

(Continued on page 219)

## chemica

(CHEMICAL PROCESSING PREVIEW)

for men who manage

Vol. 18

No. 8

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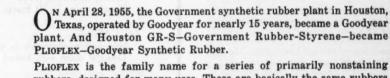
CHEMICAL

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DIVISION



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rubbers, designed for many uses. These are basically the same rubbers that were in production when the plant changed hands. However, a new and stimulating ingredient-free enterprise-has been added.

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A similar standard also has been raised for the PLIOLITE latices -former GR-S latices now being manufactured in the also newly acquired Goodyear plant at Akron, Ohio.

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When inquiring check CP 8344 opposite last page



#### Over the editor's shoulder

#### **Editorial landscaping**

This spring I had the opportunity of seeing beautiful Bellingrath Gardens near Mobile, Alabama. One thing that impressed me about these sixty acres that bloom the year 'round is the organized planning in presenting the colorful plant life to the tourist. In every direction I was greeted with a combination of precise order and graceful line.

It struck me that we are striving for something comparable in our "landscaping" of the editorial pages in CHEMICAL PROCESSING. Objective of our layouts is to provide a setting for each story to dramatize it for 1) instant evaluation as to personal interest and 2) easy, time-saving reading. This means a balance of text, photos, diagrams, and color.

We're fortunate in having the "acreage" available — in our square-format magazine — to help make these editorial "displays" attractive. Two facing pages provide us with a "plot" of more than 22" long and 11" high . . . lots of room with which to work in layout.

You'll get an idea of what we mean by looking at the eight pages starting with page 12.

There's more "editorial landscaping" like this coming up in future issues.

H.W. Liehten Lerger

ART EDITOR

- For more information on articles and advertisements in this issue, check the handy Reader Service slip opposite last page
- The product directory, pages 210 to 212, is your guide to all articles and advertisements
- To subscribe to this magazine, see reader-qualification form opposite last page

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#### THIS MONTH'S COVER

William C. Dabney, pictured on CHEMICAL PROCESSING'S cover this month, represents the team which pioneered development of Epoxy resins for coatings and other uses. Pioneer of Progress article, starting on page 10, tells how this team started with a chemical concept and arrived at new materials which set new standards.



Association and Society addresses appear on page 209

Aug 8-19. "Low Temperature Engineering and Research", Special Summer Program, Massachusetts Institute of Technology, Cambridge, Mass.

Aug 24-26. Western Electronic Show & Convention, Civic Auditorium, San Francisco.

Sept 6-17. Production Engineering Show, covering field of automation, Navy Pier, Chicago.

Sept 11-16. American Chemical Society, 128th National Meeting, Minneapolis.

Sept 12-16. Instrument Society of America, 10th Annual Conference & Exhibit, Shrine Exposition Hall, Los Angeles.

Sept 20-22. Society of Industrial Packaging & Materials Handling Engineers (SIPMHE), Annual Packaging & Handling Exposition, Kingsbridge Armory, NYC.

Sept 22-23. Chemical Market Research Assn., The Cavalier, Virginia Beach, Va.

Sept 22-24. American Assn. of Textile Chemists & Colorists, Atlantic City.

Sept 25-28. American Institute of Chemical Engineers, Lake Placid Club, Lake Placid, N. Y.

Sept 26-30. Atomic Industry Trade Fair, Sheraton-Park Hotel, Washington, D.C.

Sept 28-30. Technical Assn. of the Pulp & Paper Industry (TAPPI), Sixth Testing Conference, Sheraton-Kimball Hotel, Springfield, Mass.

Oct 3-5. Federation of Paint & Varnish Production Clubs, 33rd Annual Meeting, The Hotel Statler, NYC.

Oct 3-5. 20th Paint Industries' Show, NYC.

Oct 9-13. The Electrochemical Society, Wm. Penn Hotel, Pittsburgh.

Oct 17-21. National Metal Exposition, Convention Halls, Philadelphia.

Oct 17-21. 43rd National Safety Congress & Exposition, Chicago.

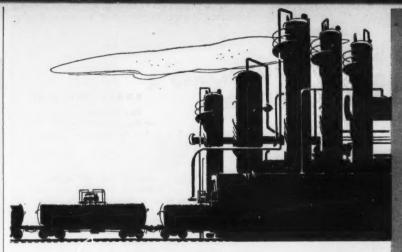
Oct 25. Assn. of Consulting Chemists & Chemical Engineers, forum & annual meeting, Belmont Plaza Hotel, NYC.

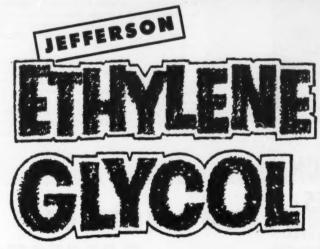
Oct 31-Nov 2. National Paint, Varnish, & Lacquer Assn., Annual Convention, Washington, D.C.

Nov 14-15. Commercial Chemical Development Assn., joint meeting with CMRA, Hotel Carter, Cleveland.

Nov 14-17. Second International Automation Exposition, Navy Pier, Chicago.

Dec 5-9, 25th Exposition of Chemical Industries, Commercial Museum & Convention Hall, Philadelphia.





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driven by TEFLON. The agitator is 72" in overall



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#### ROGER WILLIAMS

Vice President and Adviser on Research and Development E. I. du Pont de Nemours & Company

Mr. Williams received his BS degree in chemistry form M.I.T. in 1914 and did graduate work in physical chemistry at that school until 1916. From 1916 to 1918, he was a research chemist with the Nitrogen Products Co. Joining the Du Pont Company in 1918, he was a chemist in the Chemical Dept. until 1924.

When Du Pont entered the synthetic ammonia business in 1924 with the formation of Lazote, Inc., Mr. Williams was made chemical director of the new company. This company later became Du Pont's Ammonia Dept.

Early in 1943, Mr. Williams was named assistant general manager of the Explosives Dept. to head development of the plutonium production project so essential to the success of the atom bomb. He was elected vice-president and director and took his place on the Executive Committee on June 18, 1945, and assumed the duties of adviser on research and development.



## research from a management viewpoint

For top return on research dollars, management must:

- Guard against premature selling of the lab's new products
- Maintain individual initiative along with smooth relationships within groups
- Speed approval of idea 'tryouts';
   let supervisors often give the goahead
- Let research personnel in on important decisions
- Teach that research though highly important — is a means, not an end

T ODAY research has great prestige and power. It has equally great responsibilities. For example, research needs to guard against overconfidence and overselling, the effects of which are manifested in various ways such as premature introduction of new processes and products, or promotion of products and processes having serious inherent defects. We all know, too, of research projects that were started too soon, or expanded too rapidly, or that were too diffuse in scope, or that were not ended when they should have been. Today, research is a "good" word. Let us be self-critical enough to keep it so. Perhaps the best way to do that is to cultivate a sense of humor about ourselves.

Perhaps it would be well, too, if we try to keep the major functions in industry always in proper perspective. Even in these days of long-established staff functions and elaborate staff organizations, there are still only two essential operating functions: manufacture and distribution. Everything else, research not excepted, exists for the purpose of support of these

two functions. Research is only a means to an end — not an end in itself.

Another aspect of organization is the position of the individual research worker. Of course all individuals are important. However, the research worker has a potential that is, without exaggeration, extraordinary. We all know that a single concept by an individual can change the whole course of an industry. We know also that skillful leaders and developers are needed, as well as those possessing creative talent. A question for management is how to provide a working climate conducive to achievement and personal satisfaction.

In order to attain such a climate, initiative must be encouraged while, at the same time, smooth working relatonships within groups and among groups are maintained. Yet to a degree, initiation and collaboration are antagonistic. The difficulty is that discovery and invention are highly individual matters, whereas the great mass of technical effort is concerned with the elaboration of ideas, and this must be done largely by groups.

Great emphasis, therefore, is placed on organization, which even in companies of moderate size, tends to be highly specialized and complex. Thus, an idea proposed by a research worker is reviewed by various levels of supervision. If the idea survives this preliminary screening, it may be considered by a research steering committee. This is a time-consuming procedure.

The remedy, obviously, lies in greater delegation of authority to experienced supervisors who will appraise ideas not with the thought of bringing up every conceivable objection, but of offering encouragement or sympathetic discouragement, as the case may be, promptly and on an intimate personal basis. The rule to follow is that the burden of proof against a reasonable tryout of an idea should be on supervision.

Carrying this theme further, suppose that exploratory work is started on the idea. From experience, we know that the probability of commercialization is very small. The overwhelming majority of ideas are discarded at one stage or another. Here again, management can demonstrate skill, or lack of it, in handling research people. Instead of discontinuing a project abruptly for no apparent reason, or offering only perfunctory reasons, how much better it is to acquaint the individual or group with the various critical factors such as cost, price, utility, volume, and patentability, the changing weights of which indicate during the experimental campaign whether the odds on success are increasing or decreasing. Then, when the day of decision arrives, there is no shock, no conjecture, no frustration. All of us like to be "in" on important decisions, and research personnel are no exceptions.

(Based on an address delivered on the occasion of the presentation to Mr. Williams of the Perkin Medal of the American Section of the Society of Chemical Industry in New York City.)



### The BIRD PRESSURE FILTER

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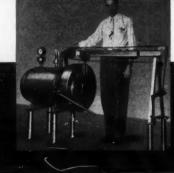
2. He has all the leaves right in front of him when the filter is open — completely

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## what you can expect in next month's issue...

## Instruments speak up

he of in g.

The little man on the right has his moment of glory next month in Chemical Processing.

We'll be featuring our regular section on Instrumentation and Control with on-thejob installation stories, a data section on instruments, and descriptions of new instruments introduced during the past year.
There will also be some pertinent comments
on Instrumentation by our Guest Editor,
Instrument Society of America President
Warren H. Brand.

Feature articles include a story out of Dow Chemical's plants at Freeport, Texas. Porter Hart, Dow's chief instrumentation engineer and former president of the Instrument Society of America, and John Cashen, Superintendent, worked with Associate Editor Gordon Weyermuller on details of the caustic plant's completely automatic operation.



Another story tells how Federal Portland Cement Co. of Buffalo cut costs of its counter-odorant system with Bendix Aviation's Windtrol (see arrow in photo), a device which lets wind direction and velocity control amount

of counter-odorant spray used. The spray formerly had to be used even when the wind eliminated the odor problem.

These and many other pertinent articles will give you leads on instruments for your applications.

#### Versenes — miracle chemicals

It took nearly two years of research, plant calls, and help of two dozen people to finally "land" an in-plant story on the application of Versenes for our readers. Our

first editorial association with these chelating agents was a history of the inception and growth of Versenes as commercially-important chemicals (see Pioneers of Progress in the March, 1955 issue of Chemical Processing). But well before this story, Associate Editor Gordon Weyermuller, acting on a suggestion from our Editorial Advisory Board, was working on the applications of Versenes to be described next month.

The story, out of Polymer Corp., Ltd., of Sarnia, Ontario, tells how minute quantities of these sequestering agents have a remarkable "smoothing-out" effect in production of synthetic rubber. The Versenes agent has proved most effective in "tying up" ferrous iron in a non-ionized form and releasing it only as needed during polymerization.

Gordon and H. L. Williams of Polymer's Research and Development Div. developed this outstanding article, to be featured in the Materials section.

## Rugged equipment handles triple superphosphate at Davison

The photo below is a scene of the huge triple superphosphate storage warehouse of Davison Chemical, Div. of W. R. Grace & Co., Barstow, Fla. This and other photos tell a picture story of the operation at Davison.



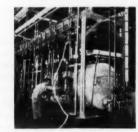
Assistant Editor Dick Callahan's story tells of one-man operation (above) with a 2½ cubic-yard scraper (below) to handle 150 tons of the cured material per hour. The article is one of four "New Solutions" highlights next month.

Here's a quick preview of features you'll find in September's Chemical Processing



"Case of the Walking Grain Cooker . . . '

At a recent industry show in Chicago, Assistant Editor Roy Helsing picked up a "lead" on the use of vibration eliminators at the Peter Hand Brewery. On a subsequent plant call to the brewery, Roy found that its 25-ton grain cooker (see photo) had literally "walked" and shaken the building. How "the case of the walking grain cooker" was solved by vibration elimination is told next month.



#### Case History water temp control at Sylvania

Water used in making solutions for a delicate process for TV tubes had to be temperature-controlled, ready for instant use, to within 1°F. An automatic water temperature control system, consisting of four heater-coolers (shown above) now does the job with greater accuracy and results in uniform top quality with fewer rejects.

Assistant Editor Ted Meinhold, on a recent visit to Sylvania's Seneca Falls, N. Y., plant, worked with Sylvania Chemical Engineer E. E. Chase on the story.

#### In November . . .

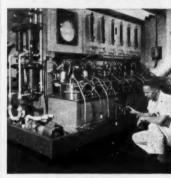
Chemical Processing will feature products, equipment, ideas, and services to be presented at the 25th Exposition of Chemical Industries, Dec. 5-9 at the Commercial Museum and Convention Hall in Philadelphia. Look for the list of companies to be on display in the November issue.



Shaker room and incubator in Fermentation Department. Powers Temperature Recording Controllers are used here.



Ampoule Sterilizers regulated by Powers No. 252 Pressure Regulators and Valves.



Fermentation process in research pilot plant controlled by Powers ACCRITEM Regulators and FLOWRITE Valves.



Vacuum Freeze Dryers equipped with Powers No. 26 Temperature Controllers.

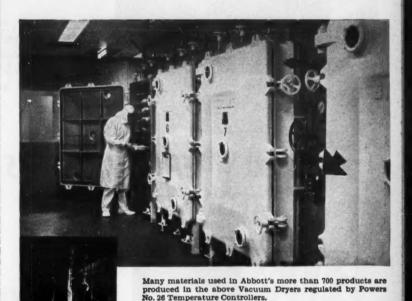
Below: Air Conditioned Room for Board of Directors and executive conferences.



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WILLIAM C. DABNEY

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EPOXY RESINS product of deliberate research



DR. J. S. LONG





L. K. SCOTT

SO many of us have grown up in today's profusion of tailored coating materials, plastics, building materials and so forth that we have ceased to marvel that someone had to devise them. Our outlook in the past fifty years has changed from "make do" to "make what's needed."

At the time that the automotive industry was getting the first production line into operation, they must have realized that such changes were being made. Had they not found that lacquers could be used in place of varnish based coatings, for example, they might have had to allow a week to dry each coat applied to automobile exteriors. It is possible that this problem and a few more like it could have made the production line impossible . . . with what consequence to us today?

But our ability to realize technical ambitions is keeping pace with the problems we face . . . and at times even anticipating those problems.

In the field of coatings, World War I saw varnishes and oils as the base of the whole paint and coatings industry. William C. Dabney, who started the Jones-Dabney Company in 1919, has watched continual change become the only constant in paint technology. In the wake of new varnishes based on tung oil came lacquers. They were a big advance over older, slow drying materials.

In the late twenties, too, synthetic resins began to appear as coating materials. Improvements in durability, weathering and chemical resistance, hardness, adhesion were made. But most of the coating materials developed prior to the second war had a common characteristic: an ester linkage in the molecule. Though this chemical characteristic was partly responsible for the fact that such materials could be used for coatings at all, it was the peak point where chemical action, weather, and age got a grip on the paint.

#### Council of War

In early 1939, three men working under Mr. Dabney decided to organize a systematic search for a coating material which did not have the Achilles' heel ester link in it. At that time, the problem had some of the aspects of looking for "dry water." It might have been supposed that this ester link was an essential part of the resin.

Nonetheless, Dr. J. S. Long, now Chemical Director of Devoe & Raynolds, parent company, L. K. Scott, now Manager of Laboratories, and Dr. S. O. Greenlee outlined types of molecules which might hold possibilities.

It was two years later - just before the war - when their work led them to compound a resin from

10

J. E. MASTERS

epichlorohydrin and bisphenol. Sent along to J. E. Masters (now Research Director) for evaluation, this resin convinced him that it was what they had been looking for. Bisphenol had allowed them to form a polymer. It had been thought that such a polymer was, if not an impossibility, at least an impracticality.

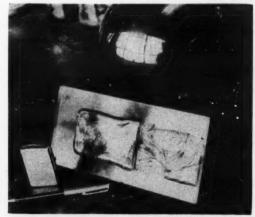
Development of this resin and other epoxy resins that stemmed from it was purely deliberate through every step of the work from early discussions right through the testing period. There was only one piece of luck connected with the undertaking: availability of epichlorohydrin.

This chemical was, at the time of early epoxy investigations, receiving new interest itself. Shell was in the midst of working out synthetic glycerine processes and supplied samples of by-product epichlorohydrin that went into the first epoxies. Shell also supplied (and continues to supply) this material when epoxies went into production. Carbide & Carbon is now in production and Dow Chemical plans to enter the field.

Despite superior properties of the new materials, it was perhaps a harder job to get them into production than it had been to work out technology. This was another of the products that were set back by the war. Chemical resistance and wear resistance of "Super Marble Floor" epoxy coating made it a strong contender in that market. But wartime restrictions kept the company from making much of this coating.

Applied research on production methods had, by this stage, become a big item of expense. Lack of equipment — and especially new equipment designed for epoxy production — made the work of the development team even tougher. One specific problem was purification of the material. It had high molecular weight, was highly active and reacted exothermically when catalyzed by alkali. To make things worse, one of the principal impurities was a trace of alkali.

(Continued on page 206)



Pulling epoxy coating from this glass plate "peeled" glass with it. Bouncing ball shows at rear



#### NATIONAL CARBON COMPANY

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> nd Fittings ng Section -7000





Cascade Coolers— Catalog Section S-6820 HCI Absorbers— Catalog Section 8-7400

When inquiring check CP 8350 opposite last page

G



Sodium reduction method for production of unsaturated fatty alcohols at Stepan Chemical provides —

## CLOSE CONTROL OF IODINE VALUE

High-purity, highly reactive materials are manufactured with yield of 90% and a maximum of safety

D. H. FRANCIS, Staff Engineer Stepan Chemical Company, Chicago, III. with GORDON WEYERMULLER, Associate Editor

Unsaturated fatty alcohol mixtures having specific iodine values (within two or three points of theoretical) are manufactured by the sodium reduction of oils and esters at Stepan Chemical Company. This is much closer control of the iodine value than is possible with other commercial processes. Another important advantage is the high product purity obtained. Material contains no hydrocarbons or appreciable byproducts, being an almost pure mixture of fatty alcohols. Each of the fatty alcohol mixtures produced is colorless and consists principally of C<sub>14</sub> to C<sub>20</sub> fatty alcohols, being within 5% of theoretical iodine value (based on the ester reduced).

Since the double-bond makes the unsaturated fatty alcohols highly reactive, they are useful for a variety of applications. They are used in plastics, plasticizers, paint, emulsifiers, additives for detergents, and many other products. About 3½ million pounds a year can be produced with present facilities. With minor changes, 6 million pounds a year could be manufactured. Although sodium reduction plant has been in operation since June 1953, flash distillation equipment for refining unsaturated fatty alcohols on plant site was only placed in operation in March 1955.

Average yield of unsaturated fatty alcohols produced

is 90% or higher. Products are manufactured with a maximum of safety. Although metallic sodium is handled, plant has not had a single accident or hazardous incident. Mixtures manufactured include saturated alcohols and unsaturated alcohols, the latter with iodine values ranging from 50 to 200. These products are made principally from tallow, sperm, cotton seed, soybean, and linseed oils.

To illustrate the seven steps in the process, consider a typical charge using linseed oil as a base:

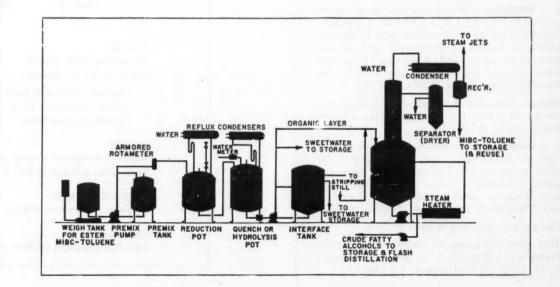
1 — Sodium dispersion — Sodium reduction vessel is purged with N<sub>2</sub> or blanketed with N<sub>2</sub> from preceding batch. Sixty-eight gal (490 lb) of toluene is added to vessel. (This had been held up from previous reduction reflux.) Then 490 lb of metallic sodium (21 24-lb bricks) is introduced through "locked" chamber into reduction pot. Contents is heated by means of steam in jacket, to 230°F, the

reflux temperature of toluene.

The sodium melts at 208-209°F in 20 to 30 min and forms lower layer in vessel. Mixture is then agitated for 15 min to get a good dispersion of sodium in toluene. This makes sodium active and gives a fast, controllable reaction.

- 2 Making premix Weighing through scale tank, 1500 lb of linseed oil and 1110 lb of MIBC (methyl isobutyl carbonyl) and 1500 lb of toluene are added to premix pot. Function of the MIBC is to release nascent hydrogen at the proper rate for an efficient reaction. Toluene serves as the solvent for the system. Both the oil and solvent must have less than 0.1% water content for high yield and minimum byproduct (soap). Premix is agitated for ½ hr and this vessel also purged with N<sub>2</sub>.
- 3 Feeding premix Premix is fed into reduction vessel through armored rotometer at a rate of 8 to 10 gpm. Flow of 1 to 2 cfm of N<sub>2</sub> is maintained, assuring safe operation in venting small amounts of byproduct hydrogen. Toluene is refluxed to dissipate heat of reaction and returned to system at 140-160°F. Pot temperature of liquid increases from 230 to 244°F as sodium alcoholates build up and dissolve in toluene. After feeding is completed, mixture in reduction pit is aged 15 min to give time for excess sodium (5%) to react with excess MIBC.
- 4 Hydrolysis In next step, 360 gal of water is added to quench pot, the amount depending on the caustic concentration desired. About 375 gal of sweetwater containing about 25% NaOH and 4% glycerine are obtained. Quench pot also has an inert atmosphere in case some sodium remains unreacted in the reduced batch.

(Continued on next page)



Twenty-four pound sodium brick is handed to operator on stand, who will introduce it into reduction pot through locked chamber at right. Note safety precautions

NG

(Continued from preceding page)

Reduction pot is pressurized with N<sub>2</sub> and toluene solution of sodium alcoholate fed to quench pot. This takes 20 min. Azeotropic mixture of toluene and water (13% water) is refluxed at 190-200°F to dissipate heat formed by reaction in which fatty alcohols, glycerol, MIBC, and caustic are formed.

All sodium ends up in caustic or soap. Amount of soap byproduct depends on free fatty acid content of oil and the moisture introduced. After 20 min period for feeding, mixture is agitated for 30 min. When agitator is turned off, three layers form.

Upper layer of about 650 gal (4000 lb) consists of a mixture of fatty alcohols, toluene, regenerated MIBC, and 1-2% water. This upper layer is later dried and then stripped of toluene and MIBC to leave crude mixture of fatty alcohols. Lower layer of about 375 gal contains sweetwater, caustic soda, glycerine, and water. Sweetwater layer is separated and stored for shipment to a soap manufacturer.

#### General Specifications of Unsaturated Fatty Alcohols

								Approx Aico	
		Hyd. No.	Sapon.	Iodine Value	Acid No. (Max)	MP °C		Unsatu- rated	Satu- rated
Makanol Makanol	8	214-219 205-219				19-23 19-21	265 264	88% 91%	12%

Center layer of 5 to 25 gal, which is a mixture of the other two layers, is sent to interface tank, where it separates into top and bottom layer.

5 — Drying organic layer — Upper organic layer is dried by circulation through heat exchangers at 200-230°F and atmospheric pressure. Water-toluene azeotrope goes overhead to condenser. After condensation, this liquid flows through receiver system into continuous gravity separator. Water is trapped off and dry toluene returned to still. Before drying, material contains 1 to 3% water and after drying, 0.04%.

6 — Stripping — Six 4000-lb batches of top organic layer, or 24,000 lb, are handled at one time by batch stripping column. About 90% of toluene-MIBC is removed at atmospheric pressure and temperatures up to 330°F. Remaining 10% is separated at same temperature under vacuum, last traces being removed at 15-20 mm of Hg.

Material remaining is a crude fatty alcohol, containing some soap byproduct and being virtually free of toluene and MIBC.

7 — Distillation — In continuous flash distillation still, 400 lb per hr of crude fatty alcohol is distilled at 400-425°F and 10 mm of Hg. This completely eliminates byproduct soap from fatty alcohols which go overhead and are condensed at 200°F. Residue of about 5% of charge is obtained.

One batch is completed in about 3 hours.

(For more information on alcohols contact Stepan Chemical Co., Dept. CP, 20 N. Wacker Dr., Chicago 6, Ill. Check CP 8351 opposite last page.) new solutions of processing problems

Three-stage centrifugal system proves economical on vegetable oil foots in making . . .

## QUALITY BLACK ACIDS FROM SOAPSTOCK

#### Operating Costs of Foots Process at Opelousas Refining Company

#### REAGENT COSTS:

Stock	Reagent	Requirement Ib/Ib Blk. Acid	Approx. Cost c/lb	Operating Cost c/lb Blk. Acid
Cottonseed	100% NaOH	0.30	3.00	0.900
	100% NaCl	0.06	1.00	0.060
	66°Be' H <sub>2</sub> SO <sub>4</sub> Acidulation	0.32	1.10	0.352
	reagent	0.0024	16.0	0.038
				1.350
Soybean	100% NaOH	0.20	3.00	0.600
	100% NaCl	0.06	1.00	0.060
	66°Be' H <sub>2</sub> SO <sub>4</sub> Acidulation	0.30	1.10	0.330
	reagent	0.0024	16.0	0.038
				1.028

#### WATER:

No cooling water needed. Water at 150°F or higher:

Soda ash cottonseed foots — 3.01 lb/lb black acids
Caustic cottonseed foots — 3.52 lb/lb black acids
Caustic soybean foots — 3.24 lb/lb black acids

#### STEAM:

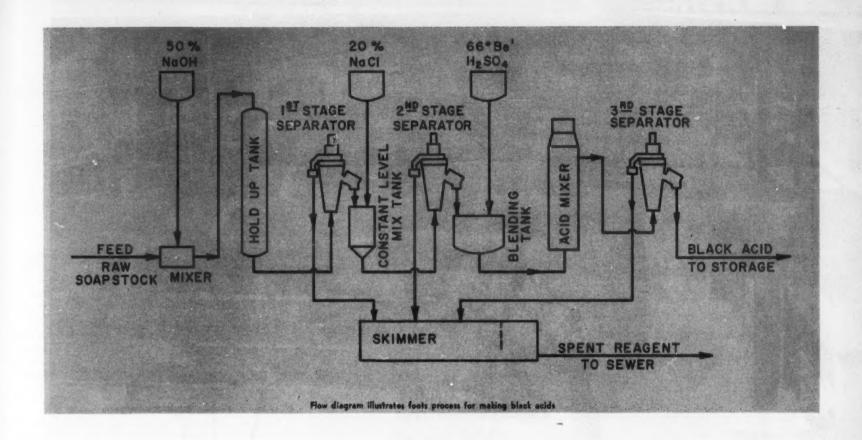
About 7 lb/min of 30 psig steam for 35 lb/min soapstock feed, or an average of 0.61 lb/lb of black acids.

#### ELECTRIC POWER:

Probable requirement is 25-30 KVA.

#### LABOR

Less than one man's full time per shift.



#### Distiller doesn't have to process acid in Twitchell or pressure splitter, can get by with one distillation

F OOTS from cottonseed and soybean oils are being refined and acidulated at rate of 45 lb/min at Opelousas Refining Company, Opelousas, Louisiana, to produce 900-1000 lb/hr of black acids. Where formerly cost of processing foots has always been marginal at best, process used by company makes operation economically attractive. Quality of finished black acids is such that distillers can obtain desired light-color acids with only one distillation—instead of two or three normally required with ordinary black acids. Process also eliminates need for Twitchell or pressure splitting operations. Material therefore, sells for premium price.

Process consists of the following: Raw soapstock and 50% caustic solution are automatically fed into

first-stage mixer by proportioning system. Saponification occurs at about 200°F. By effective mixing, 98% of saponification takes place in first stage.

Passing to hold-up tank or "grainer", resultant soap grains out. Mixture then goes to first-stage centrifuge where soap and lye phases are separated, thereby removing solids and other impurities from soap. Clarified soap phase (containing about 47% TFA) goes to second-stage constant-level mixing tank where it is dissolved in hot water and regrained with 20% NaCl to effect an additional reduction of impurities.

From mixing tank, material passes to second-stage centrifuge where the two phases are again separated. Soap phase here contains about 57% TFA. Impuri-

ties removed in lye phase of second phase include pitch, color, and oxidized acids.

After this separation, material moves on to the third stage for acidulation. The soap, hot water, and 66° Be' sulfuric acid are metered automatically into blending tank where the acid splits the sodium from the sodium soaps to give the free fatty acids and neutral oils. A third centrifuge separates black acids from spent acid, and sends it to storage.

Of the total fatty acid content in feed soapstock, 90-95% (by weight) is recovered in the final product. Accountable losses, amounting to 2-5%, occur in lye and spent acid streams.

Third stage may be operated with only slight excess of sulfuric acid over the theoretical, but improvement in black acid color and quality at roughly twice theoretical is sufficient to warrant operation at the higher level.

Process can also operate with peanut, coconut, tallow, linseed, and soya soapstock feed.

(Foots process was developed by The Sharples Corporation, Dept. CP, 2300 Westmoreland St., Philadelphia 40, Pa. Check CP 8352 opposite last page.)

NG



Scrubber system at Kaiser's aluminum reduction plant uses water at rate of 6400 gpm, but efficient recovery system . . .

## keeps make-up water down to 3-5% of demand

R. W. LEESON,
Development Engineer
Kaiser Aluminum and Chemical Corporation
with TED F. MEINHOLD, Assistant Editor

T HANKS to an efficient waste-water recovery system, water consumption for 16 four-scrubber-tower units at Kaiser Aluminum and Chemical Corporation's Mead, Washington, aluminum reduction plant, is only three to five per cent of the scrubbers' maximum demand. Each of the 64 scrubbers requires about 100 gpm. Make-up water (to replenish evaporation and waste-disposal losses) is added to system at rate of 250 gpm. Water is drawn through four

220-ft wells from an underground stream directly below plant, having an estimated flow of  $1\frac{1}{2}$  billion gal per day.

The wet scrubbing system is used to remove carbon and alumina particles and fluoride-bearing gases from each of the 16 "pot" rooms, each housing 70 electrolytic cells. Bulk of the collected particulate materials is returned to the reduction cells. Fluorides are absorbed by the water.

fro

flue

One of the sixteen 70-cell "pot" rooms at Kaiser Aluminum's Mead, Washington, plant. Ducts lead to 70"- diam collector-duct outside building

> Acid-bearing scrubber effluent is neutralized in the three 30-ft-diam contractor tanks shown in foreground. In background is 125-ft-diam reactorclarifier tank

Acid-bearing effluent from scrubbers is neutralized in three concrete contactor tanks, each 30' in diameter, with a water depth of 14'. Tanks have electrically-operated impellers providing an individual mixing capacity of 2700 gpm. Retention time is 11.5 minutes for a 6400-gpm flow.

Neutralization is achieved with slaked lime added as effluent enters first contactor. Average pH of effluent from scrubbers is about 3.0. Effluent leaving third contactor has pH of 8.0.

#### Reaction Time 30 Min

Neutralized effluent next enters 125'-diameter reactor-clarifier. Tank has side water depth of 12' and slopes to an 18' center depth. Clarifier's central column overflows the effluent into a 50'-diameter and 10.5'-deep reactor column, where the calcium fluoride particles increase in size and settle to bottom during the 30-minute reaction time. Impeller, located in the central entrance column, circulates the fluid and draws the low-density, solids-bearing liquid through ports in bottom of central column.

Liquid (in central column) is lifted by the impeller back to water level where the liquid falls into a hindered settling state, causing small particles to adhere to each other to form fast-settling masses. Solids in bottom of tank are collected with inward-raking rakes, and sludge is drawn from a center thickening well by means of pumps. Solids are pumped to sludge beds and placed in storage piles after drying.

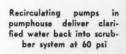
Clarified water, at an average turbidity of 10 ppm, overflows serrated weir into a peripheral launder and then into pump sump. Centrifugal pumps deliver water back into scrubber system at a line pressure of 60 psi.

(Waste-water recovery system was furnished by Process Engineers Incorporated, Dept. CP, 420 Peninsular Avenue, San Mateo, California . . . or for more information check CP 8353 on handy form opposite last page.)





Large 1000-ft 70"-diam collector-duct removes carbon and alumina particles and fluoride-bearing gases from "pot" room. There are 16 of these long ducts at the Mead works





## reagent-grade aromatics in tank car quantities



Platforming-Udex plant at Cosden produces high purity aromatics for critical applications

ACS reagent-grade and ASTM nitration-grade specifications met without difficulty with Platformer-Udex combination which has performed even better than expected at Cosden Petroleum

DEWEY MARK, Organic Chemical Division Cosden Petrolsum Corp., Big Spring, Texes with GORDON WEYERMULLER, Associate Editor

Platformer-Udex process at Cosden Petroleum Corporation has not only enabled plant to make aromatics in tank car quantities that meet ASTM specifications for nitration grade — but in some cases has produced material that has a higher purity than analytical reagent grade aromatics in small bottles — as shown

by infrared spectroscopic analyses. Moreover, this high purity of benzene and toluene has been achieved without difficulty.

Plant, which went on stream in September 1952, was first in the country to use the Platforming-Udex combination to produce simultaneously all three aromatics—benzene, toluene, and xylene. Process has performed even better than expected. For example, catalyst life has high as 80 bbl/lb has been obtained. Plant has been able to obtain a considerably higher throughput than design figures, with low mainte-

nance and an average aromatics yield of 95%.

Reason plant adopted present process stems back to need for a method to produce and separate aromatics from West Texas crude, while maintaining production of premium quality gasolines. After exhaustive investigation, Cosden engineers were convinced that the Platforming-Udex combination provided the solution to their problem. Platformer is used part of the time for motor fuel and part of the time for aromatics. The aromatics are then purified by the Udex solvent extraction process.

One outstanding advantage obtained from use of the Platformer is that aromatics are produced sulfur-free without further treatment. In the Platformer charge stock, control is exerted over sulfur, arsenic, and lead. A Porocel clay-charged tower was installed in charge splitter bottoms of feed preparation section.

Boiling range of the Platformer feed stock for aromatics operation is 150-300°F. Although original design called for 2800-2900 bbl per day Platformer throughput on BTX operation, plant has been able to process 3600 bbl per day.

BTX Platformate for Udex charge has a boiling range of 150-320°F after stabilizing. Solvent used in the Udex process is a mixture of water and diethylene glycol. While original Udex design called for a 1600 bbl per day throughput, plant has been able to process as high as 2400 bbl per day.

Prior to final fractionation into benzene, toluene, and xylene, the Udex concentrate is given a clay treatment. Plant has had great success in meeting acid wash color specifications through the use of Attapulgus clay. Life of clay has averaged between 5000 and 8000 bbl per ton.

Benzene and toluene have been well within the 1°C specification for nitration grade. Cosden has found that confusion exists in the minds of some people on this specification since the actual distillation range for the same sample varies considerably, depending upon which laboratory procedure is followed, either ACS or ASTM. This is illustrated by the following typical inspection of Cosden benzene and toluene.

#### Typical Inspection Distillation Range

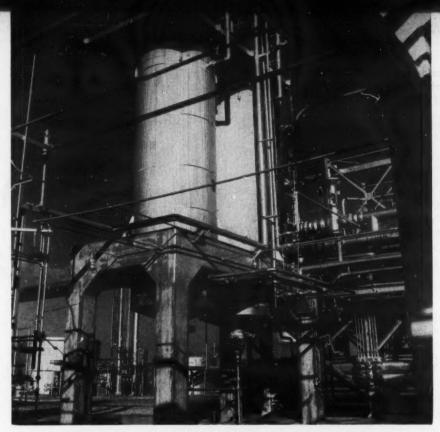
В	enzene	Toluene		
ASTM	ACS	ASTM	ACS	
0.9°C	0.3°C	0.7°C	0.4°C	

Xylene column was originally designed for the production of 10°C material. However, plant regularly produced 6-8°C material and has produced 3-5°C material without any changes in equipment.

Considerable evidence has been accumulated of the value placed by users on the purity of these aromatics for critical applications. Products have been used for the synthesis of cortisone, for distribution by laboratory supply companies as reagent chemicals, and in the preparation of benzoic acid derivatives for use in foods. The pure aromatics have also contributed to product uniformity.

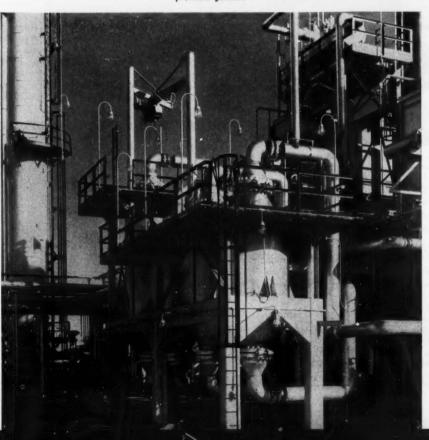
Platforming-Udex plant has had only one routine scheduled shutdown for inspection since it was placed on stream nearly three years ago. Outside of that, plant has operated continuously since the startup. Only a minimum of maintenance has been required. (Plant was constructed by Procon Inc., Dept. CP, 1111 Mt. Prospect Rd., Des Plaines, Ill.)

(Platforming and Udex processes are licensed by Universal Oil Products Co., Dept. CP, 30 Algonquin Rd., Des Plaines, Ill. . . . or for more information check CP 8354 on handy form opposite last page.) (For more information on aromatics contact Cosden Petroleum Corp., Dept. CP, Big Spring, Tex. . . . or check CP 8354A on handy form opposite last page.)



Clay-treating towers in Udex section which provide purification treatment

Platinum-containing catalyst in these reactors is the key to high purity aromatics and premium gasoline



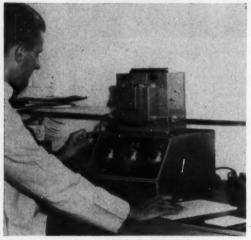
## Match leather colors accurately with perfectly objective color instrument . . .

judgment does not come into play except in choosing pigments to try out

Problem: When automobile or furniture manufacturers submitted samples of leather to be matched, Ashtabula Hide & Leather Company had experienced men make this match. Process was long and tedious. Even a perfect match was open to dispute since difference in gloss of finish often obscures identity of a color when leather surface is compared to a shiny plastic or painted metal.

In cases like this, opinion—even though expert is likely to lead to disputes which cannot be settled objectively.

Solution: Leather manufacturer turned to a perfectly objective instrument to measure colors. Known as a color-difference meter it is designed for rapid, precise measurements of color and small color differences. Unit has two parts. Upper part



Leather sample is placed in upper part of instrument; photo cells and reading dials are in lower part

is an exposure unit containing light source and holder for "viewing" specimens with different photo cells. Lower part contains measuring unit with its photo cells and associated components.

Reading produced by instrument is a set of three numbers for each color measured. One dial reads in luminous reflectance or visual lightness. Two other scales measure chromatic color as red-green and yellow-blue.

When red-green scale reads plus, for example, sample is definitely red or reddish cast. A zero reading on this scale indicates a gray color while minus indicates a green color. Familiar National Bureau of Standards formula can be used with the three readings to provide an accurate standard for



## Dowicide Preservatives

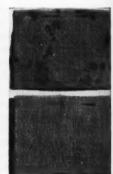
CAN BE AT WORK IN YOUR PLANT WITHIN HOURS NOW... AND EXPERIENCED SERVICING ON PRESERVATIVE PROBLEMS IS AS CLOSE AT HAND











IT'S THE DOWICIDE TREATMENT THAT MAKES THE DIFFERENCE IN ALL THESE PRODUCT SAMPLES . . .

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benefit considerably by using one or more of these fourteen outstanding bactericides or fungicides. They're all characterized by high stability, ease of handling and proved effectiveness. Dow's technical specialists can be brought to your plant or office to consult with you regarding individual preservative problems. For detailed information, mail coupon to THE DOW CHEMICAL COMPANY, Midland, Michigan.



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you can depend on DOW CHEMICALS



When inquiring check 8355 opposite last page

comparison. In using the instrument, requirement is to match all three numbers to corresponding numbers of the original sample.

When a manufacturer's sample is received now, it is immediately inspected by means of the instrument. Three color readings are noted. Various pigment combinations are tried with the instrument until the reading matches submitted value within established tolerance limits. Matching sample is submitted to customer and if approved, retained pieces are cut up and established as masters for production and inspection. Manufacture of leather can then be controlled by measuring color and lustre of each lot produced.

Results: Accuracy of the instrument has been found to be far closer than can be achieved by expert viewing. Standardized illumination and compensation for gloss of the sample are two of the factors that contribute to this. Instrument virtually eliminates any rejections due to color deviation from the original. Errors in production can be corrected as rapidly as they occur.

(Hunter Color and Color-Difference Meter is a product of Henry A. Gardner Laboratory, Inc., Dept. CP, 4723 Elm St., Bethesda 14, Md. . . . or for more information check CP 8356 on handy form opposite last page.)

#### Recommendations for welding

Over 300 metal-joining applications and procedures are described in 32-page booklet. Timeand money-saving data presented include text and illustrations on welding and overlaying all base metals using all heating methods.

Recommendations are given for welding cast iron without pre-heating and dismantling, use of low-cost alloys instead of silver, joining "difficult" metals such as aluminum with minimized warping, stress, distortion, and danger to base metal.

"DirectoRod Guide" (TIS 1340A) is available from Eutectic Welding Alloys Corp., Dept. CP, 40-40 172 St., Flushing 58, N. Y. When inquiring specify CP 8357 on handy form opposite last page.

Nomograph on depreciation of capital investment, prepared by CHEMICAL PROCESSING Editors Bruce Fader and Frank McElroy, appears on pages 196 and 198 to start this month's data section.

The axial flow fan design offers distinct advantages well worth considering for a growing variety of jobs:

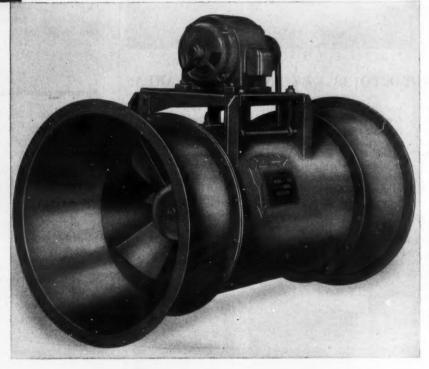
- 1. STRAIGHT LINE EFFICIENCY. Being basically designed for duct mounting, the axial flow is at its best when mounted in straight duct runs. "Buffalo" Axial Flows are giving excellent service as duct-mounted "boosters" in systems-also as light-duty ventilation, exhaust and industrial air conditioning supply fans.
- 2. LIGHT WEIGHT. This permits economical installation. In all but the very largest sizes, no heavy foundations or structural support are required. "Buffalo" Axial Flow Fans are often installed as part of the pipe or stack in hood and vat or other roof exhaust systems.
- 3. SPACE SAVINGS. These duct-size fans fit in close to walls or ceilings. Space-saving applications vary from paint spray booth exhaust to forced draft for cooling towers - from circulation of chilled air in quick freezing to boiler room cooling. Here, high efficiency influences the choice, as well as compact size.

Naturally, all axial flow fans are not alike. When you specify "Buffalo", you are assured of the top performance inherent in the "Q" Factor\*. Write today for Bulletin 3533-EF for full details.

Right, "Buffalo" Type "B" Vaneaxial Fan, Outlet guide vanes smooth out air flow for greatest efficiency and quiet operation. Available for high or low temperatures, corrosive fumes, explosive atmospheres,

NOTE: No one fan is the answer to every problem. "Buffalo" builds all types, including broad lines of centrifugal and propeller fans. Full details on request.

\*The "Q" Factor - the built-in Quality which provides troublefree satisfaction and long life.





#### BUFFALO FORGE COMPANY

PUBLISHERS OF "FAN ENGINEERING" HANDBOOK Canadian Blower & Forge Co., Ltd., Kitchener, Ont. Sales Representatives In All Principal Cities

INDUCED DRAFT EXHAUSTING FORCED DRAFT COOLING HEATING PRESSURE BLOWING AIR CLEANING AIR TEMPERING

When inquiring check CP 8358 opposite last page

#### NEW SOLUTIONS of processing problems

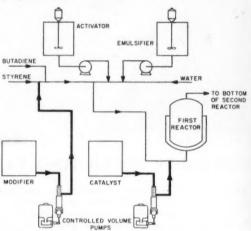
#### Controlling polymer chain length in synthetic rubber process is proportion problem . . .

catalyst and modifier fed with reciprocating pumps in manufacture of rubber

ru "t

Problem: When butadiene-styrene synthetic rubber is made continuously, seven major ingredients are proportioned in manifolds feeding a train of reactors. Of these materials, the modifier and the catalyst liquids makeup a very small part of the

Yet unless proportion of these two materials to total is held accurately, reaction speeds up or slows down. Since reaction rate governs molecular weight, final properties of the rubber depend on proportioning.



Concentrations of modifier and catalyst are regulated with controlled-volume pumps as shown by simplified flow sheet

Continuous rubber process uses two Solution: reciprocating, controlled-volume pumps. These add catalysts and modifier. Modifier is added to manifold along with butadiene, styrene, activator, emulsifier and water. Catalyst is added to this mix just before it enters first of twelve reaction vessels. Latex product is then discharged from the top of the last reactor.

Results: Accurate metering of catalysts gives close control of reaction rate and therefore molecular weight and properties of finished product. Correct amount of modifier assures finished latex will have desired average polymer chain length, which is still another condition affecting product properties.

(Controlled-volume pumps are product of Milton Roy Company, Dept. CP, 1300 E. Mermaid Lane, Philadelphia 18, Pennsylvania . . . or for more information about manufacturer's product reader may simply check CP 8359 on the convenient Reader Service slip opposite last page.)

### Small peroxide bleaching range solves space problem

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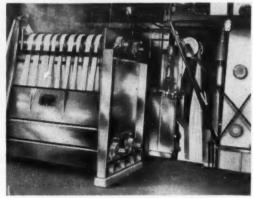
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Small but complete peroxide bleaching range has solved space problem and at same time fulfilled need for continuous unit at Bates Manufacturing Company, Augusta, Maine. Available space was small — consisting only of a single room measuring 38 x 63′, with 24′ headroom. Support columns running length-wise down center made room even "tighter". Equipment installed includes a single-stage "Rangette" with 200-gallon saturator, 1200-lb capacity J-box, and washers arranged in U formation 35′ wide with legs extending 14′ and 19′. Plenty of working space remains.

Over-all appearance and design of range is quite similar to larger-size production models — main difference being scaled-down machines for continuous operation at lower speeds in accordance with smaller production models. Bates' engineers added other conveniences too. A 300-gallon make-



Bleaching equipment is arranged in U formation, 35' wide with legs extending 14' and 19'

up tank and gravity-flow chemical-feed system for caustic and peroxide were located on a mezzanine adjacent to the J-box platform. Also located on mezzanine is packaged-unit DC motor-generator set. The final white washer was raised to permit gravity counterflow of wash water back to the first greige washer.

Steam requirements are from 250 to 300 lb per 1000 lb of goods processed. Temperature in J-box is varied from 160 to 200°F. Control stations for drive and instruments are positioned over bottom section of J-box, where they are accessible and space-saving.

Rangette uses single-stage process developed by Du Pont. Brightness tests indicate that unit is yielding the required bleach as well as the "bottom" so essential for dyeing solid colors.

(Single-stage Rangette is product of Rodney Hunt Machine Company, Dept. CP, 273 Maple Street, Orange, Mass. Check CP 8360 opposite last page.)

## Save Hundreds of Dollars

ON Many Process
Pump Applications

ALLIS-CHALMERS
CHEMICAL
PUMPS

This pump will do many of the jobs of a costly refinery-type pump, yet it costs hundreds of dollars less to buy.

It isn't meant to do every job in the chemical industry. But it will handle a big percentage of the jobs. Check the construction and design features that make this possible:

- It's built in most used ratings... to 3500 gpm, heads up to 550 ft.
- Handles liquids in most common temperature range...up to 550 F.
- Pumps liquors, corrosive materials and solutions, and petroleum products.

- Built in wide choice of materials including: iron, bronze, aluminum bronze, stainless steel, high nickel alloys and others.
- Available with several sealing methods including standard packing, inside and outside mechanical seals, plus special features such as cooling water jacket, smothering gland and others.
- Features double-row, oil-lubricated bearings, Two oil rings running in generous reservoir of oil carry oil to bearings.
- Rigid cast-iron frame supports pump body and holds bearings in alignment.

Get complete information. Call your nearby Allis-Chalmers district office. Or write to Allis-Chalmers, Milwaukee 1, Wisconsin. Ask for Bulletin 52B7638.

A-434

## **ALLIS-CHALMERS**



When inquiring check CP 8361 opposite last page



## How Norwich Pharmacal solved a separation problem

### in the production of Nitrofurans

PROBLEM: Nitrofurazone is a nitrofuran used in the treatment of surface infections in wounds, burns and surgery. In the synthesis of nitrofurazone, one of the final steps involves separating out the precipitate, a finegrained material which does not drain readily. The slurry is corrosive to stainless steel. After separation, the product must be washed to remove acids. The product is valuable so loss must be avoided.

For this step Norwich Pharmacal engineers SOLUTION: specified a 30" Tolhurst Center-Slung® Centrifugal with rubber-lined case and rubber-covered basket, 2-speed explosion-proof motor and fume-tight cover with feed and spray pipes. A filter bag is used.

RESULTS: Entirely satisfactory. Slurry is fed at low speed to facilitate drainage. High speed is used for extracting. After centrifuging, the nitrofurazone is washed (at low speed) with treated water introduced through the spray pipe. The slurry does not affect the rubber lining. The filter bag inside the basket prevents loss of product.

Tolhurst engineers stand ready to cooperate with you, too, in solving your problems. Samples of the material you wish to process will be tested without charge in Tolhurst's laboratory. Tolhurst engineers will design and build centrifugal equipment to meet your specific needs. If you wish, your installation and start-up will be supervised by an experienced Tolhurst engineer. Field and home office engineers are always at your service.

A new catalog describing Tolhurst centrifugals is just off the press. Just ask for your copy.

Tolhurst CENTRIFUGALS

American Machine and Metals, Inc.

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Company			
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City	Zone	State	

**NEW SOLUTIONS** 

#### Chemical wastes conveyed to underground wells with plunger pumps

The Upjohn Com-Problem: pany, Kalamazoo, Mich., was faced with the problem of finding a satisfactory method of disposing of chemical wastes. Wastes consist of a chemical sludge of high biochemical oxygen demand, with a specific gravity of 1.0, pH 6.5, at temperatures ranging from 40 to 50°F. Solids content is below 10 microns in size.

Solution: In October, 1954, two single-acting, plunger-type pumps were placed in service. Each unit has three cylinders, 21/2"



Pumps handle chemical wastes at Upjohn Co.

corrosion-resistant plungers, with 4" stroke. Each pump is powered by a 30-hp motor.

Pumps each have a capacity of 50 gpm at 900 psig. They can be used together, if required, although the capacity of one pump is usually sufficient. Because of this, only one desurger is used.

These pumps transfer chemical wastes to disposal wells, one of which is located in a corner of the pump building and the other 1000 ft away. Wastes are neutralized to a 5.5-6.0 pH before pumping.

Results: Chemical wastes are conveyed easily and quickly to the disposal wells with equipment in

For more information on prod-uct at left, specify CP 8362 . . . see information request blank opposite last page.

use. According to one supervisor in the Construction and Maintenance Division at Upjohn, pumps are eminently satisfactory for this application.

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(Type F-60 Triplex pumps are manufactured by The National Supply Co., Dept. CP, Two Gateway Center, Pittsburgh, Pa. . . . or for more information check CP 8363 opposite last page.)

#### Oil line plugging stopped by plastic pipe . . .

smooth interior prevents paraffin accumulations

High paraffin con-Problem: tent of crude oil from Jet Oil Company's well operations at Coulterville, Illinois, caused clogging of 2" and 3" metal lines. Pipe had to be heated with a torch to keep the paraffin in solution - a lengthy procedure.

Solution: Company replaced metal pipe with butyrate plastic pipe. Smooth interior prevents paraffin accumulations.

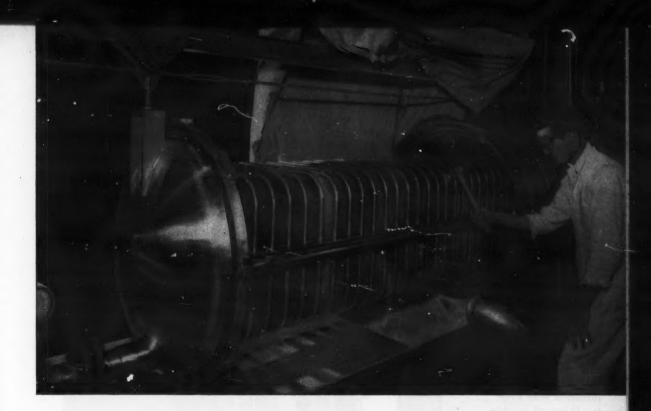
Plugging problem ap-Results: pears to have been whipped. A total of nearly 51/2 miles of plastic pipe has been installed in past three years - more than half of which is in production lines from well heads to storage tanks. Because of pipe's corrosion resistance, it is also used in salt-waterdisposal lines.

(Tenite butyrate plastic, from which pipe was made, is product of Eastman Chemical Products, Inc., Dept. CP, Kingsport, Tenn. . . . or for more information check CP 8364 opposite last page.)

(Butyrate plastic pipe was supplied by General Oil Field Supply Company, Dept. CP, New Harmony, Ind. Check CP 8364A opposite last page.)

For more information on prod-uct at right, specify CP 8365 . . . see information request blank opposite last page.





### How Norwich Pharmacal solved a separation problem

## in the production of Nitrofurans

Furazolidone is a nitrofuran widely used PROBLEM: in veterinary medicine, for the control of poultry diseases. In the synthesis of furazolidone, one of the final steps involves filtering the product from the suspension. The slurry is corrosive to carbon steel. After filtration, the cake must be washed with water, then partially dried and quickly removed so it can be fed to a tray dryer.

For this step Norwich Pharmacal engi-SOLUTION: neers specified a Niagara Honizontal Pressure Leaf Filter with 245 square feet of surface area; type 316 stainless steel at all liquid contact points; fitted with a low-pressure steam jacket. It is equipped with a special manifold at the top for blowing in hot air.

Entirely satisfactory. After the furazoli-RESULTS: done collects on the filter leaves, it is

washed with water, then partially dried inside the filter with hot air at 80° C. The leaves then roll out of the filter tank on a monorail and the semi-dry cake drops off the leaves into a cart, ready for feeding to the tray-dryer. Only a few minutes are required for one man to clean the filter and ready it for the next cycle.

Niagara stands ready to cooperate with you, too, in solving your problems. A Niagara field engineer will gladly run preliminary tests on your material, using a laboratory size filter. Should you decide to run production scale tests in your own plant, Niagara pilot filters are available to you. Niagara engineers will design and build filters to meet your specific needs. If you wish, your installation and start-up will be supervised by an experienced Niagara engineer.

For detailed information, clip and mail the coupon.

N	iagara	FILTERS

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American Machine and Metals, Inc.

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Specialists in Liquid-Solids Separation



## Completely Sanitary Construction

Cut-away view with recycle bowl. Note the oversized discharge covers and heavy-duty triple-bearing suspension drive assembly.

The DH-3 can be furnished with even the frame of stainless steel.

Designed to handle liquid flows up to 18,000 gallon/hr.

Rugged, simple, spur gear "Parallel Drive" handles power loads up to 50 HP.



Here is the centrifuge that's built in every detail for those many applications requiring higher than normal throughput capacity and heavy-duty performance. The DH-3 stands in a class by itself... far above the well known smaller sized DH-2 Nozljector, and has already set new standards of centrifuge performance.

Bulletin 1276 is just off the press. Get the facts.

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Associated Companies and Representatives throughout the World

When inquiring check CP 8366 opposite last page

## Higher yield, uniform product results with triple-action homogenizer-disperser . . .

versatile mill processes high-quality grease at rate of 600 to 800 lb per hr

When Bel-Ray Co., Inc., Madison, N. J. was making plans to start commercial production of Polylube grease about three years ago, a number of different types of mills were tried on a laboratory scale. Higher yields and a more uniform product were obtained with a triple-action homogenizer-disperser which grinds by the action of a rotor against a stator. Grease produced was also of higher quality, being clear and not cloudy.

For these reasons and because mill could handle required production, a 10" plant unit was placed in service. Principal use of mill is for preparation of Bentone-base grease, Polylube. Oils, gelling agent,



Grease is uniformly dispersed by hydraulic shearing action between rotor and stator of mill, in use at Bel-Ray Co. Inc., Madison, N.J.

dispersing aids, and other additives are mixed at room temperature and passed in liquid state to the homogenizer. Due to the shearing action of the mill, ingredients are dispersed and become solid grease. Production rate through mill is 600 to 800 lb of grease per hour. Grease goes through mill at 30 psi and comes out at 250-260°F.

Homogenizer is quite versatile. Bel-Ray also uses it in manufacturing inorganic lubricants. Materials such as graphite, molybdenum disulfide, or zinc oxide are dispersed in a petroleum oil or grease formulation.

Material to be processed enters unit (left in photograph) from direct connecting pump and is fed by means of a worm impeller to cavity in front of rotor.

Centrifugal force of the face of the rotor feeds product into three rotor-stator grinding and homogenizing surfaces where it is subjected to a terrific hydraulic shearing action. Spacing between rotorstator surfaces determines particle size of product,

(Homogenizer-disperser is product of Tri-Homo Corp., Dept. CP, 190 Highland Ave., Salem, Mass. . . or for more information check CP 8367 on handy form opposite last page.)

#### Provides maintenance-free service in catalyst regenerating . . .

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blower handles mixture of hydrogen and water at ethyl chloride plant

At the National Petro-Chemical plant at Tuscola, Ill., when lab tests show that catalyst activity is falling off, it becomes necessary to recharge the catalyst. This is done by blowing hydrogen and water vapor through acetylene converters.

Recharging period usually takes about eight hours. Blower used to recharge the catalyst has been in use now since late 1953 and has provided maintenancefree service so far.



R. T. Ball, mechanical engineer at National Petro-Chemical, inspecting blower used in catalyst regenerating system

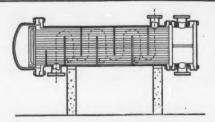
The blower they're using is equipped with balanced pressure seals to provide gas-tight operation. Lubricating oil passing through the bearings serves to cool and lubricate seals.

Blower is direct-coupled, operates at 1750 rpm and is driven by a 125-hp motor. Inlet pressure is 23 psia while discharge pressure is 37 psia, giving a pressure differential of 14 lb. Capacity at inlet conditions is 910 cfm.

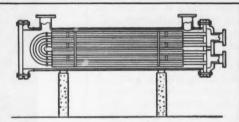
(Model 9B16 blower is a product of Blower-Stoker Div. of Read Standard Corp., Dept. CP, 370 Lexington Ave., New York 17, N. Y. . . . or for more information check CP 8368 on handy form opposite last page.)

## BROWN FINTUBE'S

BETTER DESIGN MEANS BETTER PERFORMANCE



 Sectional View of Conventional Bare Tube Heat Exchanger Showing the Transverse Baffles that require the flow to make a series of 180° Bends, Resulting in Substantial Pressure Drop; Adding Unnecessarily to Pumping Costs; and producing Back Eddies, where Entrained Solids can Settle Out, Further Reducing the Heat Transfer Efficiency, and Increasing Cleaning and



· Sectional View of Brown Fintube Bundle Exchanger. Fluid Flows through Hundreds of Long, Straight, Narrow Passages in Intimate Contact with the Heat Transfer Surface. The Only Pressure Drop Occurring Results from the Impingement of Flow Against the Heat Transfer Surface, and the Bends as the Fluid Enters and Leaves the Unit, Minimizing Pumping Costs, also Cleaning and Maintenance.

### BROWN FINTUBE'S DESIGN **ELIMINATES BAFFLES**

## Minimizing Pressure Drop



 View Showing the Banding of Al-ternate Fintubes to Prevent "Nesting", and Outer Bands that Produce a Tight, Compact Bundle of Long, Narrow, Straight Passages.

• The "bundle" in a Brown Fintube Exchanger consists of our integral "one-piece" fintubes connected with return bends; the other ends rolled into a tube sheet. A metal band strapped around each alternate fintube prevents "nesting", and the entire assembly is then banded tightly together.

This construction produces hundreds of long, narrow, straight passages, through which the fluid flows. Carefully controlled velocities develop a turbulent flow, keeping heat transfer coefficients in a desirable range. There are no baffles, as when bare tubes are used, with their 180° bends to cause pressure drop, and create back eddies where entrained solids can settle out. In Brown Fintube

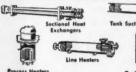
exchangers, pressure drop results only, from the impingement of the fluid against the heat transfer surface, and the bends entering and leaving the unit.

The "one-piece" fintubes, available in carbon steel, alloy or non-ferrous metals, have 6 or 8 times more surface than plain bare tubing. They transfer more heat per lineal foot than plain bare tubing, saving space and weight; - and at lower temperatures per square foot of surface, preventing damage to heat sensitive materials.

Write for Bulletin No. 521. It lists dimensions and capacities of standard sizes. Other sizes and designs to meet any requirement. Write for your copy of Bulletin No. 521 today!



355 HURON ST., Elyria, Ohio





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When inquiring check CP 8369 opposite last page

NG

### Knocks out contaminants from compressed air

Problem: A filter was needed to make certain that compressed air was free of any entrained contaminants before it was used in particle size reduction of sulfa drugs by Abbott Laboratories' Wheeler fluid energy mill.

A filter utilizing glass wool or carbon filtering material was tried but caused excessive pressure drop. Air compressors were some distance away, and a filter that caused little or no pressure drop was required.

Solution: Fulflo SSXWC-10-3/4 filter was placed on the 100-psig air line. This unit was adapted for air filtration by adding an aluminum baffle or deflector sleeve to shield the element, made of cot-

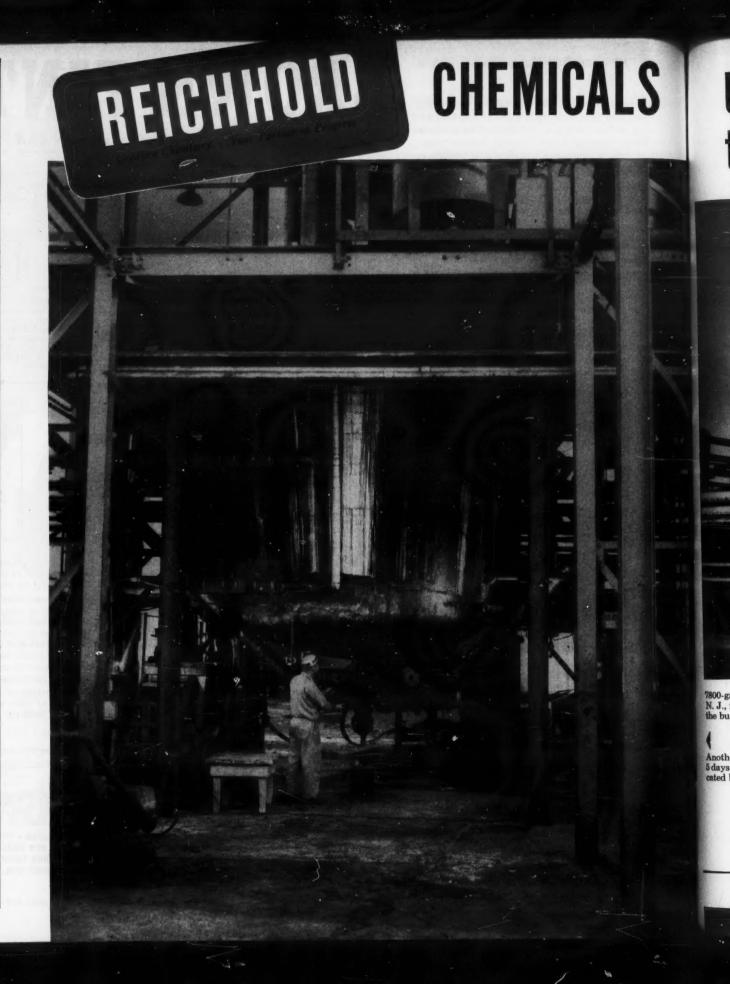


With renewable element of cotton fibers, air filter is used on fluid energy mill

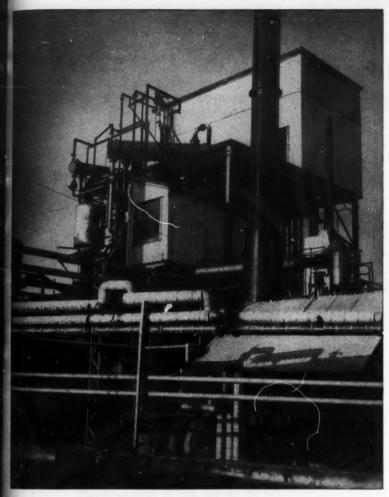
ton fibers, from direct action of air stream. Unit handles up to 100 cfm of air.

Results: Filter does exceptionally fine job of maintaining air purity. Pressure drop is negligible. Cartridge is replaced approximately every month, when running one shift per day. It removes entrained oil or moisture in addition to microscopic solids.

(Fulflo filters are a product of Commercial Filters Corp., Dept. CP, 2 Main St., Melrose, Mass. ... or for more information check CP 8370 opposite last page.)



## USES STAINLESS STEEL to maintain purity and top quality



7800-gallon Stainless Steel reactor at Reichhold Chemicals, Inc., Elizabeth, N. J., is housed in this structure. Two Stainless Steel heat exchangers atop the building and much Stainless Steel piping serve it.

Another view of the 7800-gallon reactor. It is in service 12-20 hours a day, 5 days a week. The reactor and piping is of special design, detailed and fabricated by Steel Alloy & Tank Company, Newark, N. J.

Manufacture of synthetic resins and industrial chemicals at Reichhold Chemicals, Inc., Elizabeth, N. J., requires utmost attention to quality and product purity. That's why Stainless Steel is the key material for equipment all the way down the line.

Processing of alkyd, phenolic and urea resins takes place in Stainless Steel reactors ranging in size from 2500 to 7800 gallons capacity. Weigh tanks, gravity feed lines, pumps, scrubbers and heat exchangers that serve the reactors are Stainless Steel, too.

Not only does Stainless Steel serve as the most satisfactory material for prevention of corrosion, erosion, cavitation and roughness in equipment, but it makes plant housekeeping easier. Stainless is a clean material that stays clean.

Stainless Steel's unique combination of properties makes it the most satisfactory construction material for the widest variety of chemical processing operations. Examine your operations and let Stainless take over the critical, difficult jobs. When you do, be sure you get service-tested USS Stainless Steel.

UNITED STATES STEEL CORPORATION, PITTSBURGH
AMERICAN STEEL & WIRE DIVISION, CLEVELAND
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
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## USS STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS



Gas pipeline anchored in 60' water by 41/2" concrete jacket . . .

linear foot of cured 30" pipe weighs 562 lb

To insure that 12 miles of pipe would stay on bottom of a lake when line became filled with natural gas, engineers covered the pipe with a 4½"-thick concrete jacket. Fully prepared and cured, each linear foot of 30"-diam pipe weighs 562 lb. To insure proper curing, about 10,000 gal of curing compound was used.

Project is part of \$20 million gas conservation plant located at Lake Maracaibo, Venezuela. Plant separates natural gas from newly produced oil, compresses the gas, and injects it back into the submerged oil lands beneath the lake, where its pressure forces more oil into easily recoverable areas.

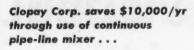
Gas plant is built on a platform some 14' above lake's surface, seven miles offshore. Pipe carrying the low-pressure gas from separation stations to plant lies in more than 60' of water and consists principally of 30" pipe—with some 26" and 24".

Individual 40' sections were prepared and connected into one-mile lengths. After sections were joined, they received a final layer of concrete to make a continuous coating. Curing compound (applied by brush or spray) permitted concrete to retain from 93 to 97% of its moisture content for 72 hours — preventing instant evaporation and assuring maximum strength and minimum shrinkage.

(Horncure concrete curing compound is product of A. C. Horn Company of Texas, a division of Sun Chemical Corporation, Dept. CP, 10th and 44th Avenues, Long Island City, N. Y. . . . or for more information check CP 8371 on handy form opposite last page.)



For more information on product at left, specify CP 8372
. . . see information request blank opposite last page.



soya oil, resin are now obtained separately and mixed while unloading tank cars

Problem: At Clopay Corporation, Cincinnati, Ohio, procedure of purchasing treated soya oil and resin solution already mixed together from supplier made these materials considerably more costly than they would have been if obtained separately. Mixture was used in the preparation of a coating for window shades.



Liquids of widely varying viscosities are uniformly mixed while they are unloaded from tank cars at Clopay Corp., Cincinnati, Ohio

Solution: About one year ago company started using a continuous pipe-line mixer, which permitted them to obtain each of the materials separately in tank cars. Steam is turned on in tank cars and the two liquids are pumped to bottom of mixer in 1 to 1 proportions.

Two liquids immediately come in contact with rapidly moving turbine agitator for first violent mixing. Flow is divided into many separate streams as it is forced through orifices dividing two chambers. Combined again, fluid is agitated once more by a propeller. Finally, flow is reversed by baffling of outlet passage. Liquid emerging from side of unit is homogeneous.

Transfer pumps used with mixer are gear-type or positive displacement units. Two valves are placed ahead of pumps so they can be throttled to control flow rates.

Results: Use of the continuous pipe-line mixer, permitting the two materials to be purchased separately, has resulted in a saving of \$10,000 per year. The 30,000 lb per month of the two ingredients used is now obtained at a 20% lower cost



**PHILADELPHIA** 

MOTOREDUCER

The ultimate in compact, neat and sturdy vertical motoreducers. These reducers have given outstanding performance in thousands of industrial applications requiring a reliable Vertical Drive.

Because of the unique single casing and boltedon motor construction, mounting and installation is simplified through elimination of extra baseplates and couplings. The planetary reduction gears provide an extremely rugged drive capable of withstanding the most severe overload service conditions. Another advantage of the Philadelphia MotoReduceR is its wide bearing span, which permits the use of long unsupported vertical shafts.

So we say: "Examine the construction of these units, and you'll understand why there's nothing like them".

PLANETORQUE is an exclusive feature that can be supplied with any Philadelphia MotoReduceR. By immediate action in breaking the motor circuit, it safeguards both driven machinery and drive unit from dangerous overloads. PLANETORQUE is widely used on stoker drives, conveyor drives, mixers, agilators, roll drives, and tumblers, etc. . . wherever overloads or jamming may be encountered.



For further information, send for 32 page Catalog #MR-54A.



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Virginia Gear & Machine Corp., Lynchburg, Va.

Industrial Gears & Speed Reducers • LimiTorque Valve Controls

Established 1892

When inquiring check CP 8373 opposite last page

since the supplier need not furnish the two liquids already mixed.

Liquids are uniformly mixed in spite of having widely varying viscosities. Treated soya oil has a Gardner-Holdt viscosity of X at 20°C (12.9 poises), while the resin solution has a viscosity of D to E (1.25 poises).

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Approximately two hours is required to transfer two 4000-gal tank cars through mixer to storage tank. This is actually less time than was formerly required when materials were received already mixed. No maintenance except lubrication has been required on mixer since it was placed in service.

(Nettco Flomix continuous pipe-line mixer is a patented product of New England Tank & Tower Co., Dept. CP, Everett 49, Mass. . . . or for more information check CP 8374 on handy form opposite last page.)



## Mixes enough in one batch for 2,625,000 ten-grain tablets

Twin-shell blender at Abbott Laboratories, North Chicago, Ill., mixes up to 3750 lb of pharmaceuticals at one time. This is enough for 2,625,000 ten-grain tablets. As little as a 1%-active compound can be uniformly dispersed in a short time, Abbott finds. Axis shaft does not extend into blender, and no baffles are inside the unit. Therefore there is no holdup, and loading and unloading are quick and easy. So is cleaning.

(Twin-shell blender is a product of Patterson-Kelly Co., Inc., Dept. CP, 120 Warren St., East Stroudsburg, Pa. . . . or for more information check CP 8375 on handy form opposite last page.)



### 

ANY product that will flow to them can be handled efficiently and economically with Tri-Clover non-agitating centrifugal pumps. Illustrated are just three of the many Tri-Clover pump models used extensively in food processing, brewing and bottling, chemical process and general industrial applications. Pumps are available in stainless steel, nickel alloy, bronze and cast iron.

Designed for efficient liquid transmission and low cost maintenance, these pumps have many exclusive features, among which are—patented screw type impellers with quick-acting impeller clips, lightweight heads with a minimum of parts, casing construction permitting fast, easy assembly or disassembly—and a wide choice of seals for various applications,

including inert carbon rotary seals for sanitary application, packing gland seals, water cooled seals and seals for latex handling.

Tri-Clover's exclusive developments are the result of many years of specialized engineering experience and thorough knowledge of liquid handling. Let our engineering staff work with you in solving your pumping problems.

See your nearest TRI-CLOVER DISTRIBUTOR EXPORT DEPT., 8 So. Michigan, CHICAGO, U.S.A.



Tri-Clover Division
Kenosha Wisconsin

TRI-CLOVER

P355



SEND FOR THE TRI-CLOVER PUMP CATALOG — One of the most complete, useful pump catalogs ever compiled. Contains engineering data on all types of pump applications. Write for your copy of Catalog 253 today.

When inquiring check CP 8376 opposite last page

NG

Alcohol	Carbon Chain Length	Average Molecular Weight	Double Bonds	Saponi- fication Value	lodine Number	Hydroxyl Value	Cloud Point (°F)	Sp gr (25/25°C)	Viscosity (SSU/210°F)
Unadol 20	16-22	270.5	3	2.0	137.5	207.5	58	0.8516	37.8
Unadol 40	18	260.0	2	3.0	137.0	216.0	59	0.8554	35.0
Unadol 90	18	265.0	3	3.0	190.0	212.0	50	0.8640	39.0
Adol 12	12	189.0	0	3.0	2.0	297.0	63	0.8321	36
Adol 40	18	282.6	1	0.84	91.8	361.7	<10	0.8968	51.0
Adol 42	16-18	260.0	1	0.80	49.7	215.8	35.5*	0.860	39.8
Adol 45	18	284.7	0	0.14	3.1	352.0	69.0*	0.9509	57.0
Adol 60	22	308.3	0	2.0	1.7	182.0	62.6**	0.7923***	46
Adol 63	16-18	265.0	0	2.0	1.6	211.8	52.8*	0.8161***	* 43.8

Unsaturated or saturated high-mw fatty alcohols

## impart good properties to many products

\* Melting point (°C) \*\* Titre (°C) \*\*\* Sp gr @ 100/25°C \*\*\*\* Sp gr @ 60/25°C

Now made on commercial-scale from domestic oils, compounds have high purities, constant chemical analysis

A number of unsaturated or saturated high-mw fatty alcohols are now available in very high purities and in commercial quantities. Produced from domestic vegetable, marine, and animal fats and oils by sodium reduction methods and precise purification, these straight-chain compounds have constant chemical analysis and iodine value. Big potential uses are as chemical intermediates where their desirable properties can be imparted to many products.

These synthetic products supplement manufacturer's present line of natural fatty alcohols derived from sperm whale oil. Using sodium reduction syntheses, the new series promises many advantages over those

previously available. They will find use directly or as intermediates in detergents, inhibitors, anti-foam agents, peptizers for synthetic rubber, in cosmetics, pharmaceuticals, and plastics as anti-oxidants, agricultural chemicals, synthetic waxes, water-proofing agents for leathers, textile finishes and fibers, and protective coatings. And there are many other applications which have not yet been explored.

Specifically, the high purity of the alcohols makes them attractive as intermediates. While the saturated alcohols primarily undergo hydroxyl group reactions, the unsaturates (containing from one to five double bonds) possess unusual versatility for both hydroxyl group reactions and those involving double bonds.

#### **Hydroxyl Group Reactions**

Aldebydes —These may be made by mild oxidation. Products would be used in resins, odorants, and

as intermediates for such compounds as 2,4-dinitrophenylhydrazones, *p*-nitrophenylhydrazones, oximes, sodium acid sulfite.

Olefins — By catalytic dehydration over alumina at high temperatures, or by cracking of an ester highly reactive olefins are produced. Alpha olefins can be epoxidized.

Ethers —Ethers of over C<sub>12</sub>-length have been virtually unknown until now, and should have a high potential. They are made by condensation over an alumina catalyst with milder conditions than above, or by the Williamson synthesis of a sodium alkoxide with an alkyl halide.

#### Vinyl Ethers

Fatty alcohol vinyl ethers — Using Reppe chemistry, acetylene adds to the alcohols to form this product. When saturated alcohols are used, the

product can be polymerized (BF<sub>3</sub> catalyst) to form waxes which serve as a moisture barrier in alkyd coating formulations. They also impart chemical resistance and sheen to polishes. Other derivatives include motor oil pour point depressants. The potential is very high.

Alkyl ethers - By ethoxylation, using a Na



While construction was still underway a few weeks ago at the Ashtabula, Ohio, works, Plant Superintendent R. D. Simmons shows details of the sodium reduction pot to Mr. O. Graziani, Plant Manager of company's Wyandotte, Michigan plant

catalyst at moderate pressure, products can be made which range from highly oil-soluble to effective water-soluble detergents and surface-active agents. A compound with "n" around five makes a good emulsifier.

$$ROH + n \left[ H_2 C - CH_2 \right] \longrightarrow RO \left[ CH_2 CH_2 \right]_n OH$$

When "n" is 10-15, compound is water-soluble. Reaction products can be sulfonated to increase water-solubility. Use of up to about 10% increases detergency of petroleum-based agents and should have an emollient effect on the skin.

#### Organic Esters

Saturated aliphatic esters — Applicable to saturated acids from acetic to behenyl, these reactions afford considerable potential for use in plasticizing waxes and to improve oil-solubility of greases, to name a few.

Unsaturated aliphatic acids — The acrylic and methacrylic acid esters are of great industrial importance as lube oil additives and in plastic films. Alcoholysis reaction of the acrylic esters and saturated alcohols can be used;

CH2 = CHCOOCH3 + ROH - CH2 = CHCOOR + CH3OH

(Continued on next page)



## How to take the AH-CHOO out of Benzoates

You may have a problem that used to bother one of our customers.

Seems their production men began to complain of sneezes and sniffles.

The culprit? Benzoic acid dust, hanging in the air in the rooms where these men worked.

The dust wasn't hazardous. But it was bothersome, at the least—and could have become a real morale problem.

**SOLUTION:** At this customer's request, we developed a *bead form* of benzoic acid, technical

These tiny benzoic acid beads keep their shape during handling, right up to the time they go into process.

**RESULT:** No dust. No more sneezes or sniffles. Happier production. And a gratified customer.

If you're using technical benzoic acid, try our bead form and see if it doesn't make a difference.

You can also get *powdered* benzoic acid from us, in both technical and U.S.P. grades. It comes in 25, 50, and 100-lb. fiber drums

#### DUST-FREE SODIUM BENZOATE, TOO

Sneezing isn't so much of a problem with sodium benzoate. But if you use ours, it's no problem at all. We've managed to perfect a flake form of sodium benzoate that's as nearly dustless as sodium benzoate can be. We do it with a special, tightly-controlled flaking operation.

You can get the resulting clean, nondusting flakes in either U.S.P. or technical grade. (We can supply you with *powdered* sodium benzoate, U.S.P. or technical, too.) If you'd like data sheets, and trial samples of either form to check against your present supply, just write us or phone the nearest Hooker sales office.



**BENZOIC ACID**, technical, in bead form is nondusting.



**SODIUM BENZOATE**, flake form, is practically dust-free, thanks to careful screening and packaging.



1905—Half a Century of Chemicals

From the Salt of the Earth-1955

#### HOOKER ELECTROCHEMICAL COMPANY

15 Forty-Seventh St., Niagara Falls, N. Y.

NIAGARA FALLS . TACOMA . MONTAGUE, MICH. . NEW YORK . CHICAGO . LOS ANGELES

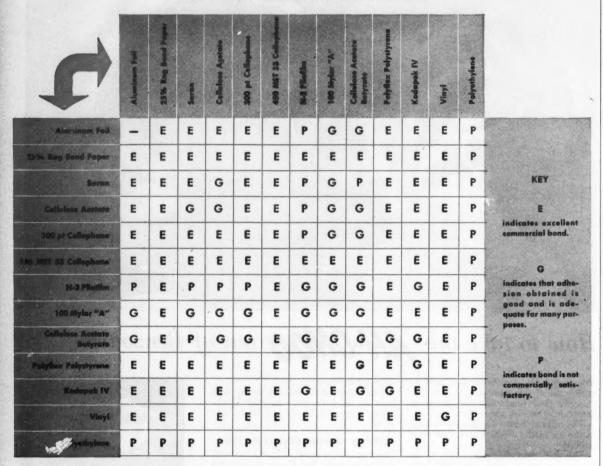
When inquiring check CP 8377 opposite last page

ING

#### **Resyn 50R 2128**

## surprisingly versatile

#### for film laminations



RESYN 50R 2128, an internally plasticized polyvinyl acetate copolymer solution, laminates a surprising variety of films—as shown in the above chart. It is soft, tacky and markedly different from straight polyvinyl acetate. Bonds formed are permanently flexible.

RESYN 50R 2128 can be thinned with practi-

cally any organic solvent, including the lower cost aromatic hydrocarbons. Write for more information.

Other adhesives are available for specialty laminations where specific requirements must be met. This "tailoring" of products is possible because of National's ability to make and to formulate unusual copolymers having unique adhesive properties.



270 Madison Avenue, New York 16 \* • 3641 So. Washtenaw Avenue, Chicago 32 • 735 Battery Street, San Francisco 11

When inquiring check CP 8378 opposite last page

#### MATERIALS

#### FATTY ALCOHOLS

(Continued from preceding page)

The linkage of the polymer chain is shown:

$$n \left[ CH_2 = HCCOOR \right] \longrightarrow \begin{bmatrix} H_2 & H_2 & H_2 \\ C & C & C \\ & & & C \\ & & & & C \end{bmatrix}$$

Other reactions, such as with sorbic acid, make interesting products. Esters made with unsaturated alcohols under carefully controlled conditions may be of further interest in long chain derivatives, where they have valuable properties.

Other esterifications — A number of other useful esters can be made with many different organic acids, such as gallic acid, succinic anhydride, citric acid, and maleic anhydride.

#### **Inorganic Esters**

Alkyl sulfates — These find use in detergents and as emulsifiers. They can be of the type ROSO<sub>2</sub>OH, or ROSO<sub>2</sub>OR. With NaOH, the former form sodium alkyl sulfates which are well-known detergents.

**Dialkyl phosphite** — Antistatic agents for spinning synthetic fibers can be made by direct esterification of monohydric aliphatic alcohol with orthophosphorous acid, employing toluene.

The triesters of phosphoric acid can also be made. Orthosilicate esters — These esters have been investigated as VI improvers and also used in drying oil studies.

#### Other Organic Reactions

Alkyl balides — These have good reactivity. They are made by reaction with PI<sub>3</sub>, HBr, or HCl and zinc. Applications as insecticides are being studied. The bromide is important as in intermediate for a number of products of interest to the pharmaceutical industry, for example isoquinoline bromide has fungicidal properties. Grignard reagents can also be formed from the halides by reaction with Mg in ether.

Urethans — Alcohols react with various isocyanates to form urethans. The fatty dialcohols (such as Adol 40 and 45) are of particular interest for making polyester resins, special detergents, and other resins. Higher alkyl urethans that have surface-active properties can be made by first reacting chlorocarbonates with fatty alcohol and then the product with ethanolamine. Degree of water solubility can be controlled by subsequent addition of ethylene oxide.

#### Reactions of the Double Bond

Polymerization — Heat and mild blowing polymerizes the unsaturated fatty alcohols. Products have been used as textile lubricants. Subsequent reaction with phosphorus compounds yields other materials

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applicable to textile use. Treatment with phosphoric or sulfuric acid and condensation with aromatics yields surface-active compounds.

Copolymerization — With styrene, copolymerization gives styrenated alcohols. Esterification with unsaturated acids yield products which can be copolymerized with various olefinic monomers, such as vinyls and butadiene. These are used in plastic compositions as their double bonds give them the ability to undego further polymerization.

Sulfurization — Addition of sulfur at the double bond gives a product useful as an additive to cutting oils, gear oils, and other lubricants. They are completely soluble in petroleum oils and improve EP characteristics. Material does not turn rancid nor oxidize, and is stable under heat and pressure.

Epoxidation — By this means, stability and surface-active characteristics and other properties of fatty alcohols can be imparted to many end products. The epoxy ring additions are carried out in presence of peracetic acid, perbenzoic or performic acid. The hydroxyl group is protected by, say, acetic anhydride. Various reagents — under modified conditions — can cleave the ring. Water, HCl, NH<sub>3</sub> and phenol are good examples.

Cyanoethylation — Fatty alcohols react with acrylonitrile to form ether nitriles. These in turn may be hydrogenated to form ether amines, which react as typical amines but possess an oxygen linkage that has good chemical and heat stability. These compounds have excellent solubility characteristics and possess very little odor.

(High-mw fatty alcohols are products of Chemical Products Div., Archer-Daniels-Midland Co., Dept. CP, 2191 W. 110th St., Cleveland 2, Ohio . . . or for more information about manufacturer's product reader may simply check CP 8379 on handy form opposite last page.)

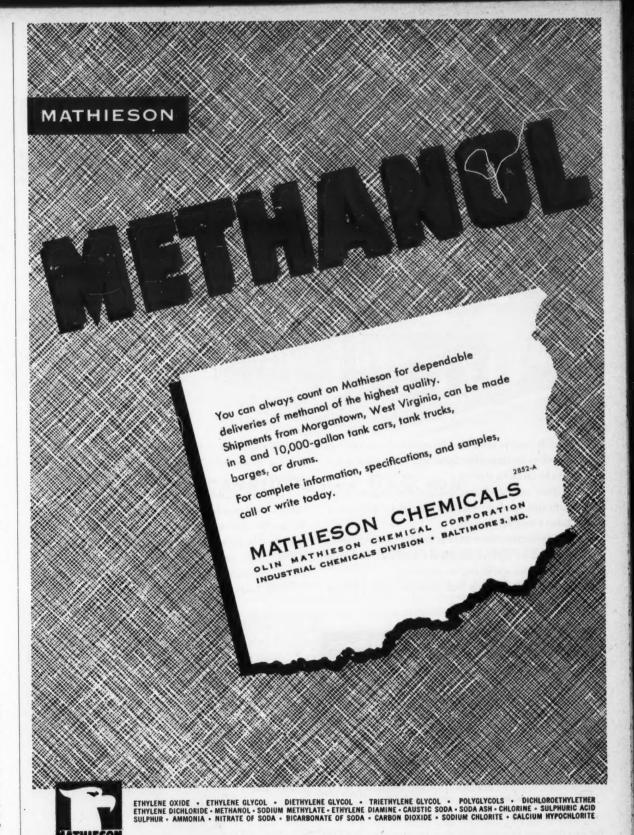
#### Develops TCP specifically for making vinyl wire insulation

Uses: Specifically developed for manufacture of vinyl wire insulation.

Features: A vinyl insulation formulation containing this compound and Cabflex di-decyl phthalate has Underwriters' Lab approval for use at both 80° and 90°C.

**Description:** Cabflex TCP, tricresyl phosphate, is made from petroleum cresylic acid.

(Tricresyl phosphate is a product of Godfrey L. Cabot, Inc., Dept. CP, 77 Franklin St., Boston 10, Mass. . . . or for more information about manufacturer's product, reader may simply check CP 8380 on the convenient Reader Service slip which is located opposite last page.)



When inquiring check CP 8381 opposite last page

NG



Candy makers have a problem when cream fillings develop disagreeable taste and odor after a few weeks on store shelves.

They've looked long and hard for a way to eliminate this spoilage which is caused by the formation of free fatty acids.

Researchers have tried to stop or slow down the reaction by adding chemical retardants. But taste and texture could not be sacrificed.

Tests have shown that in some cases addition

of 1-2% Glycerine almost doubles shelf life, promising a more trouble-free future for the candy industry.

The unique balance of properties that won such wide acceptance for Glycerine in the candy industry in the past continues to open new doors to progress. In paints, foods, pharmaceuticals, packaging . . . for tomorrow's surge of new specialties . . . in formulations and reactions yet unknown. Nothing takes the place of Glycerine.

#### This balanced group of properties keeps

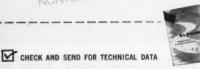


vcerine's usefulness growing

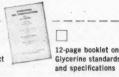
HYGROSCOPICITY - STABILITY SOLVENT POWER - VISCOSITY - NONYOLATILITY NONTOXICITY - TASTE - MW/HYDROXYL RATIO -

HUMECTANT .

CARRIER - SOLVENT - LUBRICANT - SOFTENER 
EMOLLIENT - ANTI-FREEZE - ALKYD BASE -









16-page booklet on Glycerine properties and applications

For your free copy of any or all of these booklets write: GLYCERINE PRODUCERS' ASSOCIATION • 295 Madison Ave., New York 17, N. Y.

When inquiring check CP 8382 opposite last page

## Produce high-purity manganese chemicals

Use ammonium carbamate extraction process on low-grade domestic ores

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An outstanding advantage of the Leute-Dean ammonium carbamate process is the direct production of MnCO<sub>3</sub> of high purity, and uniformity. The MnCO<sub>3</sub> serves as an ideal starting material for a great variety of manganese chemicals in addition to its direct uses. Also, extraction process is not limited to utilization of the low grade ores of the Cuyuna Range, but can be applied to other large domestic manganese deposits.

Basic and principal chemical being manufactured is MnCO<sub>3</sub>. It is produced in the form of a free flowing powder, with a bulk density in the range of 100#/ft<sup>3</sup>, and contains 45% to 46.5% manganese. By calcining under controlled atmospheric conditions, MnO, Mn<sub>3</sub>O<sub>4</sub>, Mn<sub>2</sub>O<sub>3</sub> and MnO<sub>2</sub> can be made. Two grades of MnO<sub>2</sub> are produced, one of which is a high purity battery grade product.

A pellet form of Mn<sub>s</sub>O<sub>4</sub> containing about 65% manganese is also manufactured for utilization in steel production.

#### TYPICAL ANALYSIS OF MANGANESE CHEMICALS (In per cent by weight)

	MnCO <sub>2</sub>	MnO <sub>2</sub> (chemical grade)	MnO <sub>2</sub> (battery grade)
Mn	45-47	61	58 min
Fe	0.1 to 0.3	-	0.25 max
SiO <sub>2</sub>	0.05 to 0.20	_	0.10 max
Other non-			
volatiles	0.5	_	
MnO <sub>2</sub> *	_	81	88 min
COs	_	1 to 4	
H <sub>2</sub> O			
(110°C)	-	0.5	I to 4
Total alkali		-	0.3 max
Other metals			
(incl. Mg)	_	_	0.1 max
HCI	_	-	0.01 max
Soluble Mn			
as MnSO4	_		0.4 max

\* Based on available oxygen, expressed as per cent MnO2

Direct applications of MnCO<sub>3</sub> include fertilizer, additive to animal feeds, pigments and ferrites.

With suitable chemical or heat processing, MnCO<sub>3</sub> can be utilized in dry cell batteries, corrosion-inhibiting paints, fluxes for welding rods, non-ferrous alloys, fluxes for magnesium production, paint dryers, fertilizers, organic oxidations.

(Manganese chemicals are manufactured by Manganese Chemicals Corp., Dept. CP, Rand Tower, Minneapolis 2, Minn. . . . or for more information check CP 8383 opposite last page.)

### High compatibility, efficiency seen in liquid nonionic surface-active agents

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garic an ne ct. % Series of nonionic surface-active agents is finding application in leather, textile, paper, metal processing, adhesive, agricultural chemical, and detergent uses. Highly compatible, the compounds are light straw colored, clear liquids, having a mild odor. Their physical properties include:

Туре	AP Alkyl phenol ether	BC Aliphatic ether	TO Tall oil ester
Active (% min)	99	75	99
pH (2% soln.)	7.0	7.0	6.2
Density (lb/gal)	8.8	8.5	8.8
Solubility in water (cloud point, °C)	<0	17	<20
Surface tension lowering (Tensionometer @ 25		oncentratio	on .
In distilled water	30	28	36
In 350 ppm water	36	28	40
Wetting properties of 0. Clarkson method, 3 gm			
In 50 or 350 ppm water	er 7	6	180
Foaming properties of 0. method @ 25°C in 50			
Initial height (mm)	185	240	80
Height after 5 min (r	nm) 155	210	65

(Siponic surface-active agents are products of American Alcolac Corp., Dept. CP, 3440 Fairfield Rd., Baltimore 26, Md. . . . or for more information check CP 8384 on handy form which is located opposite last page.)

### increased rate of floc growth and subsidence possible with flocculation aid

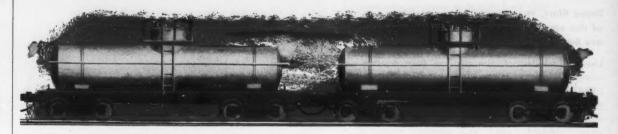
Uses: As flocculation aids in industrial water treatment.

Features: When used with common coagulants such as alum and ferric sulfate, these materials increase rate of floc growth and floc subsidence 4 to 10 times the rates possible without polyelectrolyte addition. They were effective over a pH range of 4.5-11.0 an were unaffected by presence of free chlorine residuals up to 20 ppm. Floc produced has greater strength, preventing redispersion by excessive turbulence.

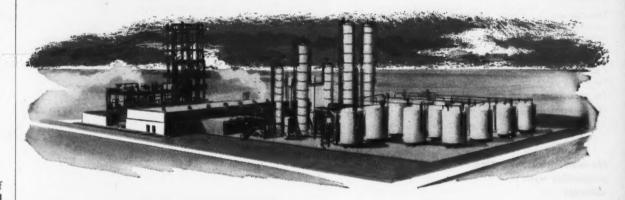
Description: Synthetic organic water-soluble polymeric polyelectrolytes make possible treatment of waters of high or low turbidities at minimum chemical cost. They also allow higher rise rates and lower detention times.

(Polymeric polyelectrolytes are products of Cyrus Wm. Rice & Co., Dept. CP, 15 Noble Ave., Pittsburgh 5, Pa. . . . or for more information check CP 8385 on handy form opposite last page.)

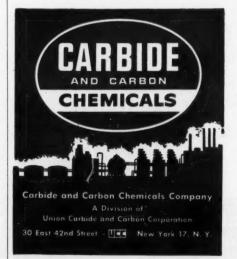
### available in tank-car quantities . . .



# primary AMYL and DECYL alcohols



### from CARBIDE'S new OXO unit



CARBIDE'S new Oxo unit at Texas City, Texas is now on stream producing *primary* alcohols that offer you broad opportunities for making new and improved products.

Primary Amyl Alcohols and Primary Decyl Alcohols are available now in tank-car quantities. These Oxo chemicals are backed by over 25 years of leadership in making oxygenated compounds. They consist entirely of *primary* alcohols and, for that reason, have found applications where greater reactivity and increased efficiency are desired. For example, these primary alcohols are intermediates for plasticizers, surface-active agents, ore flotation reagents, corrosion inhibitors, synthetic lubricants, and oil additives.

These alcohols are the first of a wide selection of Oxo chemicals and of products derived from Oxo chemicals. One example of these derivatives is Primary Amyl Acetates, now available in tank-car quantities. Write today for technical information on Primary Amyl Acetates, or on Primary Amyl or Primary Decyl Alcohols.

In Canada: Carbide Chemicals Company, Division of Union Carbide Canada Limited, Montreal and Toronto.

When inquiring check CP 8386 opposite last page

ING

### Dried films, thermosetting compositions of this epoxy resin water emulsion are hard, tough, flexible

Uses: Include protective coatings, floor polishes, adhesives, paper, plastics, glass, metal, and textile processing.

Features: Resin emulsion is compatible with almost all resin emulsions or plasticizers. With amine, aldehyde, amid, and phenolic resins, it produces thermosetting compositions which are hard, tough, flexible, water- and solvent-resistant, and can be used for casting glass fibers, laminations, and moldings. Dried films also have good properties.

Description: Epoxy Resin Water Emulsion is milk-white, contains 40% epoxy solids. MP is 67-70°C. pH is approx 6.9. Emulsion is stable and compatible in acid, alkali, and salt mediums.

(Emulsion is a product of Chemical Products Corp., Dept. CP, PO Box 61, Little Falls, N.J. . . . or for more information check CP 8387 on handy form opposite last page.)

### No wetting or rewetting properties with softener

Uses: With water, forms both permanent and non-permanent water repellents on textiles.

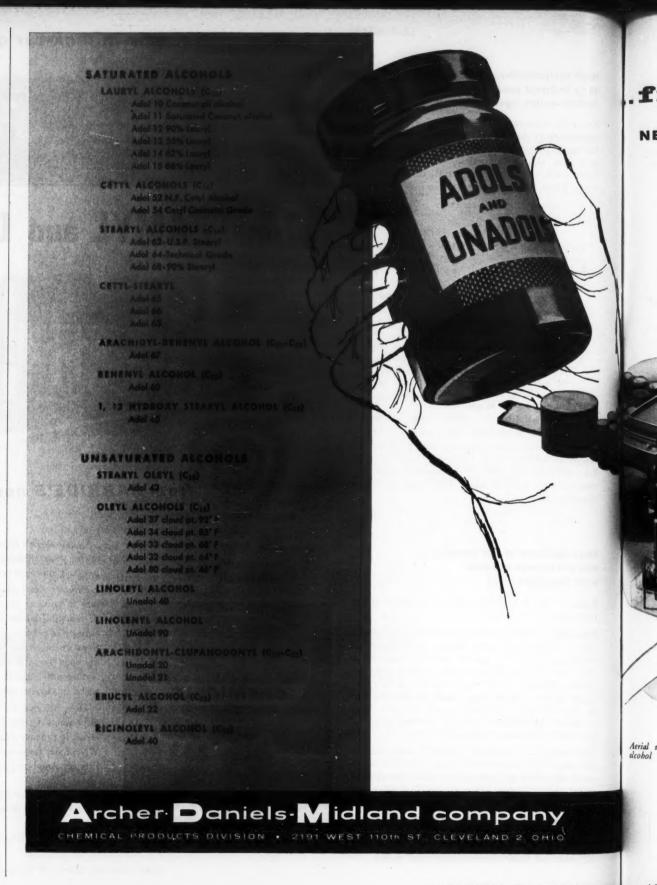
Features: Softener has no wetting or rewetting properties, and doesn't affect spray rating of fabrics. Resistance to salt, acid, or alkalis is high, and no odor or color develops in storage of treated fabrics.

Description: Dextrol GM-94, a nonionic softener, should be used in quantities of 12 to 24 lb per 100 gal of mix when used directly in water repellent. For mixing with latices, use 30 to 60 lb per 100 gal mix; for padding, 16 to 25 lb in 100 gal water.

(Nonionic softener is a product of Dexter Chemical Corp., Dept. CP, 819 Edgewater Rd., New York 59, N.Y... or for more information check CP 8388 on handy form which is located opposite last page.)

### Lists manufacturers of Mo chemicals

Compilation of more than 50 molybdenum chemicals and their manufacturers is available in Bul Ch-6, issued by Climax Molybdenum Co., Dept. CP, 500 Fifth Ave., New York 36, N.Y. When inquiring specify CP 8389 on handy form opposite last page.

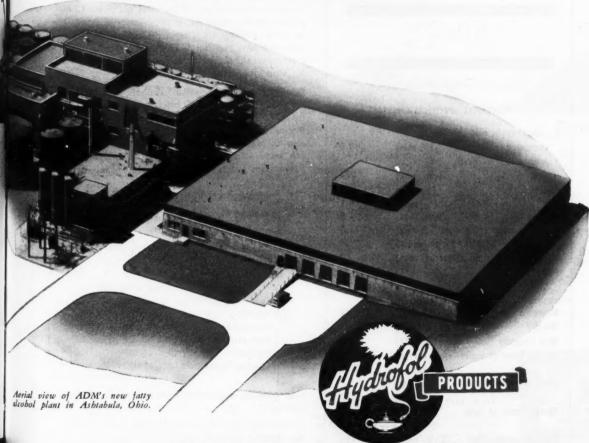


### from Ashtabula to you!

### NEW FATTY ALCOHOLS TO WORK WITH

Starting into full production, this month, are advanced alcohols never before available—saturated and unsaturated fatty alcohols that can impart improved characteristics to textiles, plastics, lubricating oils and greases, detergents and countless other products.

Here in one of the country's fastest growing chemical centers, ADM will process linseed, soybean, marine and coconut oils, animal fats and many other fats into ADOLS and UNADOLS of improved properties and higher purity. You are the benefactor for it is into your products that these new chemicals will pour. Check the list carefully on the left, and write for samples and specifications. As new alcohols are developed, we will publish advance information. A letter from you will put your name on the select list to receive information about these new ADM Chemifats.



Hydrogenated and Distilled Fatty Acids and Stearic Acid . . . Hydrogenated Vegetable, Fish, Sperm Oil and Tallow . . . Hydrogenated Castor Oil . . Stearyl, Cetyl, Oleyl, Alcohol . . Sperm Oils and Spermaceti . . Behenic Acid . . . Erucic Acid . . . Hydroxystearic Acid . .

Other ADM Products:

Linseed Oil, Soybean Oil, Fish Oil, Paint Vehicles, Vinyl Plasticizers, Foundry Binders, Industrial Cereals, Vegetable Proteins, Wheat Flour, Dehydrated Alfalfa Meal, Livestock and Poultry Feeds,

When inquiring check CP 8390 opposite last page

# High-temperature polyethylene film resists environmental cracking, contains oxidation inhibitor...

irradiated, it can be used at temp up to 125°C

Uses: Packaging food and drugs, as protective wrapping, and in layer electrical insulation and encapsulations.

Features: Besides offering all advantages of conventional polyethylene, product can be used continuously at temperatures up to 125°C, even higher in special applications. It also resists environmental stress-cracking in contact with certain solvents, detergents, or organic acids.

In the encapsulation of conductors or various electrical devices, it provides a homogeneous, water-tight case of excellent properties.

Description: Irrathene 201, an irradiated polyethylene film, contains an oxidation inhibitor which permits continuous use at 125°C, or even higher. This is an improvement over the previous product, Irrathene 101 (CHEMICAL PROCESSING, Dec 1954, pp 28-29). Physical properties at room temp are practically unchanged from those of conventional polyethylene. As it is heated, tensile strength decreases linearly up to about 100°C. It then levels out at about 100-200 psi, a residual strength which it retains at least up to 175°C. Compound will not flow under its own weight at temp at least up to 250°C.

Film is swollen by hydrocarbons and chlorinated solvents at elevated temp, but is unaffected by silicone oil.

(Irradiated polyethylene film is a product of Chemical Development Dept., General Electric Co., Dept. CP, One Plastics Ave., Pittsfield, Mass. . . . or for more information check CP 8391 on handy form opposite last page.)

# Organic brominating agent is less hazardous to use

Uses: As a brominating agent for many organics.

Features: It is more useful and less hazardous to use than bromine and other brominating agents.

Description: Dibromodimethyl hydantoin is available in commercial quantities. The cream-colored powder melts at about 184°C, and has an active-bromine content of about 54%.

(Dibromodimethyl hydantoin is a product of Glyco Products Co., Inc., Dept. CP, Empire State Bldg., New York 1, N.Y. . . . or for more information check CP 8392 on handy form opposite last page.)

# SURFACE AREA FOR SALE — 9 Million Sq. Ft. to the Pound!

The Internal structure of ADSORBITE Activated Carbon provides up to 200 acres of adsorptive surface area per pound. This makes ADSORBITE ideal for a variety of applications, including:

Catalysis, air conditioning, solvent recovery, separa-



tion, purification, water treatment, waste disposal, gas masks, pollution elimination.

Write for free bulletin
No. 27, "ADSORBITE Activated Carbon." Samples
submitted, just detail your

# BARNEBEY-CHENEY CASSADY AT EIGHTH COLUMBUS 19, OHIO

In Canada: BARNEBEY-CHENEY LTD., St. Johns, Quebec

When inquiring check CP 8393 opposite last page



Fel-Pro's exclusive C-5 colloidalcopper formula "copper-plates" metal, prevents locking, galling and direct contact between thread assemblies even at 1800°F without breakdown! And C-5 is safe for all metals! Prevents galvanic pitting even where dissimilar metals are joined! Protects all threaded surfaces of bolts, plugs and studs, insuring their repeated re-use. WRITE TODAY FOR FREE BULLETIN!

FELT PRODUCTS MFG. CO.

1515 Carroll Ave., Chicago 7, III.

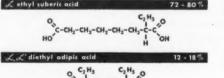
When inquiring check CP 8394 opposite last page

### materials

Intermediate for plasticizers, synthetic lubricants, polyamide and polyurethane resins —

# isosebacic acid has high reactivity

U. S. I. ISOSEBACIC' Acid
a mixture of C<sub>10</sub> Dicarboxylic Acids



### TENTATIVE SPECIFICATIONS

C10 dicarboxylic acid

content	(% min)	76.3
Volatile acids, as acet	ic	
acid	(ppm, max)	300
Moisture	(% max)	0.3
Ash	(% max)	0.1
Iron	(ppm, max)	3
lodine Number	(max)	1.0
Color (APHA,	20 gm in 100	
ml n	nethanol, max)	60
Melting Range	(°C)	68-74
PHYSICA	L PROPERTIES	
Molecular weight	(apparent)	202.24
Density (10 It	/gal@ 80°C)	8.55
Melt viscosity	(cps @ 80°C)	78.5
Specific heat of vapor	(est. cal/gm	
	@ 226°C)	0.34
Heat of vaporization	(cal/gm	
	@ 226°C)	107
Specific heat of solid	(cal/gm	
	@ 24°C)	0.33
Heat of combination	(K cal / mole)	1296
Flash point	°F, closed cup)	430
Ionization constant	(at 25°C)	
K <sub>1</sub>		3.5 x 10-5

Material undergoes many reactions, and is easy to handle

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god

It

Now available in developmental amounts, U. S. I. Isosebacic acid® is stable and easy to handle, undergoes a wide variety of chemical reactions. Compound shows considerable promise as a raw material for making vinyl resin plasticizers that have low volatility, are non-migrating, and impart low-temperature characteristics. End uses include: plastic hose, upholstery for furniture.

Esterified with long chain alcohols, product can be used in synthetic lubricants for jet planes. In alkyd resins, it improves water resistance and flexibility of surface coating films. Compound also increases flexibility of polyester resins, and can serve as an intermediate to make nylon-type polyamides for textile fibers, molding and extru-

### **ACIDITY OF AQUEOUS SOLUTIONS**

Weight %	acid	рН	at 25°C
0.1			3.5
0.4			3.2
0.9			3.1

### SOLUBILITY DATA @ 20°C

Solvent	gm acid/100
Water	1.1
Methanol	98
Methyl Acetate	28
Acetone	49
Glacial Acetic acid	52

sion plastics, and other type polyamides for adhesives.

In chemical syntheses, the material can be used as the starting point to make polyurethane resins for foamed plastics, synthetic rubber, and protective coatings. It can serve as an intermediate for salts, esters, glycols, amides, diamines, nitriles, and acyl chlorides.

Made from readily available chemicals (butadiene

and sodium), potential users can look forward to working with a dependable product, from standpoint of quality, availability, and price.

Isosebacic acid, a white crystalline solid, undergoes typical reactions of the dibasic acids, and reacts with alcohols to give acid and neutral esters.

### VAPOR PRESSURE

	Temperature
Vapor pressure,	
mm Hg	°C
2.9	200
13.3	230
32.8	250

With basic materials it gives acid and neutral salts. It is relatively stable, not oxidized by air at ordinary temperatures. It is moderately corrosive to mild steel, but readily handles in stainless.

Isosebacic acid development began at the University of Cincinnati, about three years ago, under a company fellowship. It is now emerging from the pilot plant stage. The acid is a mixture of isomers, as shown in accompanying diagram. It has the physical properties described in the table.

(U.S.I. Isosebacic acid is a product of U.S. Industrial Chemicals Co., Div. of National Distillers Products Corp., Dept. CP, 99 Park Ave., New York 16, N.Y... or for more information check CP 8395 on handy form opposite last page.)

### Have You Wondered Why -

a manufacturer's name and address appear at the end of many articles . . . ?

The "source" of editorials, which we indicate by publishing a company name and address at the end of many articles, is not "advertising" for the manufacturer. It's put there as an editorial service to help you get more information on processes, materials, ideas, and equipment which interests you.

It also helps us to decide, from your response, which subjects you want most in CHEMICAL PROCESSING. Our handy Reader Service slip, located opposite the last page, helps you to get the details you want in a hurry . . . helps us get the best stories in lining up future issues.

THE EDITORS

# Your best buy in detergents

Flakes

Granules

Powder

Whether you repackage dry detergents "as is" or incorporate them in a specific product—you'll find it to your advantage to investigate D-40, produced by the world's largest supplier of synthetic detergent raw materials.

Strictly competitive in price, superior D-40 is available in a particle size suitable to your own needs.

Inventories are maintained throughout the U.S. to make D-40 readily available no matter where you're located.

Oronite has many helpful "use" bulletins showing a variety of fields where D-40 can be successfully used. Contact the Oronite office nearest you for consultation on Oronite detergents or fill out the coupon below.

Other Oronite Surface Active Products:

DETERGENT ALKANE
(Basic Raw Material)
DETERGENT SLURRY
DETERGENT D-60
PURIFIED SULFONATES

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### ORONITE CHEMICAL COMPANY

200 Bush Street, San Francisco 20, California 30 Rockefeller Plaza, New York 20, New York 714 W. Olympic Blvd., Los Angeles 15, Calif. 20 North Wacker Drive, Chicage 6, Illinois Mercantile Securities Building, Dallas 1, Texas Carew Tower, Cincinnati 2, Ohio



### DETERGENTS ORONITE CHEMICAL COMPANY 200 Bush Street, San Francisco 20, California

I am interested in your D-40 quality, price and "use" story and would like to talk it over with an Oronite representative.

Name...

Address.

Company\_

Type of Business.

When inquiring check CP 8396 opposite last page

NG



# Uses: nature Featt non-son on a again Dosa stock little Descretely white 125° 0.

The laboratory methylating equipment shown above is being explained by Dr. T.R. Patterson, head of our Methylation Department.

# Your methylating problems could end here!

If you have a problem relating to the methylation of an organic compound, why not call in an Ansul specialist? It actually isn't necessary to start at the "beginning." Methylation has been a specialty of ours since 1936. The experience we have gained by methylating more than 100 compounds during the last 18 years is at your disposal to help solve your particular problem.

Our methylation laboratory is equipped to take over your methylating problem at any stage of development and come up with a practical answer. We have manufacturing facilities for producing commercial quantities of a methylated compound to your specification.

Ansul is a major producer of methyl chloride and prepared to supply you with quantities ranging from laboratory cylinders to tank car lots. Our methyl chloride is available in cylinders of 100 lbs., 140 lbs., and 1300 lbs., and tank cars of 40,000 lbs. and 78,000 lbs. Delivery is prompt.

Address your correspondence to the head of our methylation laboratory, Dr. T. R. Patterson, Ansul Chemical Company, Dept. C-35, Industrial Chemicals Products, Marinette, Wisconsin.

# ansul

When inquiring check CP 8397 opposite last page

### Non-discoloring and non-staining antioxidant for light-colored natural, synthetic rubbers

recommended dosage of 0.5 to 1.5% on RHC doesn't affect cure rate

Uses: Antioxidant for white and light-colored natural and synthetic rubber products.

Features: Compound is non-discoloring and non-staining. Recommended dosages of 0.5-1.5% on rubber hydrocarbon give good protection against effects of oven and oxygen bomb aging. Dosages as low as 0.25% can be effective on some stocks. In suggested amounts, antioxidant has little or no effect on cure rate.

Description: Chemically 2,2'-methylene bis (4-ethyl-6-tertiary butyl phenol), compound is a white crystalline powder melting from 119° to 125°C. Sp gr is 1.10. Rubber compositions containing 2.0% of the material have shown no evidence of antioxidant bloom after extended aging. (Antioxidant 425 is a product of American Cyanamid Co., Dept. CP, Bound Brook, N.J. . . . or for

more information check CP 8398 opp. last page.)

# Surface properties of kaolin changed so as to render it hydrophobic . . .

material has low absorption, is easy to mix

Uses: Should be evaluated in paint, inks, rubbers, reinforced plastics, and other organic systems.

Features: Significant change in surface properties suits it for use with organic systems where improved wetout, reduced viscosity, low mixing time, and minimum tendency to agglomerate are important attributes. pH's are approximately neutral.

Description: Water-fractionated kaolin has been treated with 1% of a cationic surface-active agent to alter hydrophilic characteristics, making the material hydrophobic and oleophilic. General properties:

Particle size (average, µ)	0.55
Oil absorption (ASTM D2 81-31)	31-32
Moisture (% max)	1.0
Bulking value (Ib/gal)	21.5
pH (TAPPI Ten, Std. T645 m-54)	6.5-7.5
Color (Brightness, % min)	85.5
Sp gr	2.58
Residue (325-mesh, % max)	0.02
Particle shape	Thin flat plate

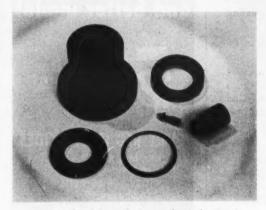
(ASP 1300 is a product of Minerals & Chemicals Corp. of America, Dept. CP, Metuchen, N.J. . . . or check CP 8399 opposite last page.)

# Easily-machined chlorinated polymer has chemical resistance, strength, can be used at 250°F...

has dimensional stability, zero water absorption

Uses: As material for parts for chemical production equipment, such as bearings, pump impellers, packings.

Features: Plastic combines mechanical strength with chemical resistance, dimensional stability, and free machinability. It can be used at tem-



Parts machined from plastic are chemical-resistant

peratures up to 250°F, and even higher if in a non-oxidizing atmosphere. It is relatively economical.

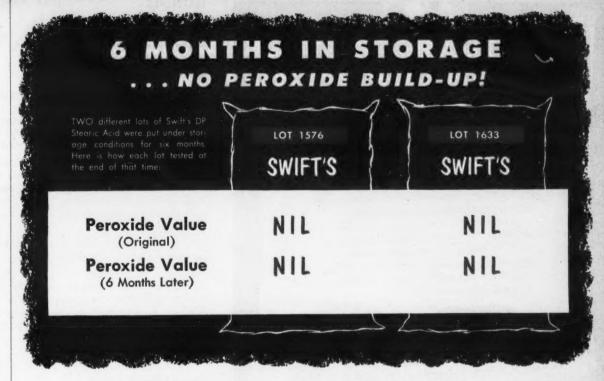
Description: Called Polypenco K-51, the chlorinated polymer is supplied in rods up to 2" diameter. Brown in color, compound resists cold flow and changes due to internal strain. Tests indicate that it has zero water absorption. Heat distortion temp is 185°F for a 264-psi load, 300°F for 66 psi. Tensile strength is 6000 psi, and Rockwell hardness is R100 at 73°F.

(Plastic is a product of The Polymer Corp. of Penna., Dept. CP, 400 Walnut St., Reading, Pa. . . . or for more information check CP 8400 on handy form opposite last page.)

### Crystalline aluminum formate is free of AICI<sub>3</sub>, Na<sub>2</sub>SO<sub>4</sub>

Crystalline compound contains 30%-equivalent alumina content and is free of aluminum chloride and sodium sulfate. Solid form cuts shipping costs as it is water-free.

(Solid aluminum formate is a product of Aceto Chemical Co., Inc., Dept. CP, 40-40 Lawrence St., Flushing 54, N.Y. . . . or for more information check CP 8401 on handy form which is located opposite last page.)



### SWIFT'S STEARIC ACID

### for lasting product freshness

Peroxide value is a measure of oxidation. Where stearic acid is involved, oxidation is an enemy to the shelf life of your product. The results of the test shown above were important to us for two reasons and should be of equal interest to you for the same reasons:

(1) Swift's Double Pressed Stearic Acid resists oxidation over extended storage. It is shipped fresh to stay fresh and to help insure the stability of your product.

(2) Results of a ten week accelerated storage test carried out under identical conditions using fresh samples of DP stearic acid produced by five manufac-

turers showed the Swift's product to have the lightest color and greatest storage stability of all samples tested.

"Application" purity is no accident with Swift's Stearic Acids. Only the better suited grades of raw materials are selected from the wide variety available to us for processing in a unique low temperature solvent process. With it, impurities and color bodies are selectively extracted. Low ash, light color, bland odor, and true product freshness and stability are the result.

Write for details today—and remember . . .
ONE TRIAL IS BETTER THAN A THOUSAND CLAIMS

USE THIS COUPON FOR FURTHER INFORMATION

C. ife	Swift & Company, Industrial Oil Dept. 1830 165th Street Hammond, Indiana Please send further information on Swift's Stearic Acid for use in:
1855 CENTENNIAL 1955	Send Industrial Oil Bulletin.  Name
TO SERVE YOUR INDUSTRY BETTER	Company  Address  City Zone State

When inquiring check CP 8402 opposite last page

G

# Odor Control in CASEIN AND ANIMAL GLUES

**Problem:** To neutralize the objectionable, characteristic odor of casein and animal glues.

Solution: The neutralization of the objectionable odor can be economically and effectively accomplished with special deodorant oil additives which can be used at concentrations as low as 0.3–0.5%. Sindar additives can also enhance the gummed tape, assembled container, envelope or other finished product by imparting a pleasant, sales-stimulating scent.



330 West 42nd Street, New York 36, N. Y.

Branches: Philadelphia • Boston • Cincinnati • Detroit
Chicago • Atlanta • Scattle • Los Angeles • Toronto

When inquiring check CP 8403 opposite last page

ARCCO compounds special Plastisols for each industrial user. For example — Formula 1548-42D for slush molding dolls and toys is copper stain resistant and non-marring. Formula 1253-43B makes duck decoys that are flexible and resilient.

There are many other specific ARCCO Plastisols for varied uses such as metal dipping, coating paper or fabric, work gloves, overshoes, play balls, automobile bumpers, paint rollers, molds and forms, and artificial flowers. They possess all the standard advantages of plastisols — ease of handling, flexibility, toughness, abrasion and chemical resistance, wide color range. Their ARCCO plus is that skilled compounding results in specific properties for each industrial use. Modifications are readily developed to meet unusual requirements.

ARCCO Technical Service will be happy to consult with you about the use of ARCCO Plastisols in your plant

AMERICAN RESINOUS CHEMICALS CORPORATION



RESIN EMULSIONS, SOLUTIONS AND HOT MELTS FOR ADHESIVE BASES, BINDERS, COATINGS, SIZES AND SATURANTS

ATION

DOLLS

and DUCKS

are just two

of many

industrial products

made better with

ARCCO PLASTISOLS

GENERAL OFFICES: 103 FOSTER STREET, PEABODY, MASSACHUSETTS In GANADA: American Resinous Chemicals of Canada, Ltd., 20 Trent Avenue, Toronto, Canada

When inquiring check CP 8404 opposite last page

### MATERIALS

Higher viscosities, harder films with high molecular weight polyethylene glycol . . .

estimated mw is in the 15,000-20,000 range

Uses: Suggested for colored pigment suspensions, aqueous-based inks, and as a binder in paper and ceramics and a release agent for rubber.

Features: Of high mw, glycol is water-soluble, has high melt viscosity and aqueous soln viscosity. Films are stronger and harder than those formed with other solid polyethylene glycols. It imparts mild thickening action combined with suspending power.

Description: Carbowax glycol 20M has an estimated mw of 15,000-20,000.

(High-mw polyethylene glycol is a product of Carbide & Carbon Chemicals Co., a Div. of Union Carbide & Carbon Corp., Dept. CP, 30 E. 42nd St., New York 17, N.Y. . . . or for more information check CP 8405 on handy form opp. last page.)

Keeps lube oil sludge effectively dispersed . . .

also improves VI and has good shear stability

Uses: Additive for motor lubricating oil keeps sludge in dispersion.

Features: Gooey engine sludge and clogged oil lines resulting from stop-and-go driving are prevented for relatively long periods of time. Additive is also effective in preventing sludging of acidic oils. In addition it is an excellent VI improver and has good shear stability.

Description: Known as Lube Oil Additives 564 an 565, both are copolymers of lauryl methacrylate and diethylaminoethyl methacrylate. LOA 565 is appreciably more viscous than 564, and has equal detergency, greater VI-improving ability, and lower shear stability.

(Lube oil additive is a product of Petroleum Chemicals Div., E. I. duPont de Nemours & Co., (Inc.), Dept. CP, Wilmington 98, Del. . . . or for more information check CP 8406 opp. last page.)

### Glazing and caulking vehicles shown

Two glazing and caulking vehicles, called Admarines, are discussed. Suggested formulations are given in Bul 103 issued by Archer-Daniels-Midland Co., Dept. CP, 700 Investors Bldg., Minneapolis 2, Minn. When inquiring specify CP 8407 on handy form opposite last page.



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When inquiring check CP 8408 opposite last page

CHEMICAL PROCESSING

### Wrinkle and hammer vehicles offered to finishers

Vehicles for wrinkle and hammer finishes offered by manufacturer include:

Alkyd-based wrinkling vehicle WV-301-A, for use where ultimate film properties are important, is a resin-modified, tung oil-extended alkyd of 60% solids in blended solvents.

Vehicle WV-302-A imparts hardness, color-retention in baking, wrinkle uniformity, and wrinkling power in thin films. It can be overprinted by silk screen process.

WV-101-S is a short tung oil-, phenol-modified oleoresinous vehicle, over 50% solids, gives optimum wrinkling and short-bake hardness at low cost.

Wrinkle vehicle WV-201-L, a medium length oleoresinous varnish of over 50% solids cut in aromatic spirits, gives a more elastic film at higher baking temp than WV-101-S. Works good in air-dry wrinkles.

Vehicle WV-302-A is used in pastel wrinkles, gives good hardness, non-yellowing properties. Can make one-coat metallic aluminum wrinkle. A most useful alkyd wrinkle vehicle.

WV-302-T is similar to the above, but employs a toluol solution for more volatility.

Gilsonite wrinkle vehicle WV-401-G, an industrial finish supplies a low cost vehicle to make dark shades.

WV-502-T, a hammer finish vehicle with good texturing qualities, makes a flexible and high-resistant finish.

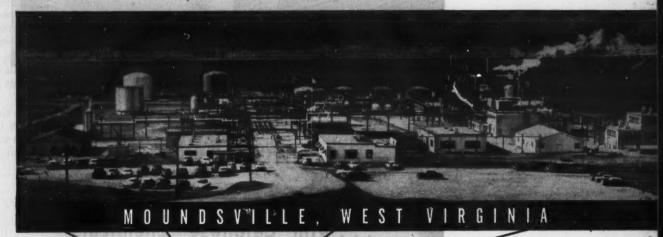
Universal vehicle QEV can be used in many industrial finishes with either baking or air drying

(Continued on next page)

For more information on product at right, specify CP 8409
. . . see information request blank opposite last page.



# Here's Where The World's Purest FUNARIC ACID Comes From





The only production direct from the catalytic oxidation of benzene, National Fumaric Acid is the highest-purity tonnage production ever achieved. Pure white, its absence of color commends it for use in resins, plasticizers and pharmaceuticals.

Our output is as dependable as its quality is high. We give exceptional service to all important consuming centers from plant stocks at both Moundsville, West Virginia and Buffalo, New York.

We will be pleased to quote and to send samples for work that may lead to new uses of National Fumaric Acid. The coupon at the right is for your convenience.



### NATIONAL ANILINE DIVISION ALLIED CHEMICAL & DYE CORPORATION

Boston Providence Philadelphia Chicago San Francisco Portland, Oro. Greensboro Charlotto Bichmond Atlanta Los Angeles Columbus, Gn. New Orleans Chattanooga Toronto



White, free-flowing crystalline powder Strength, min. \_\_\_\_\_\_99.5%

 Strength, min.
 99.5%

 Ash, max.
 0.1%

 Maleic Acid, max.
 0.1%

please send sample
of National Fumaric Acid to:

NAME\_

COMPANY\_

ADDRESS\_

A



Glacial ACETIC ACID eliminates a hidden cost in textile dweing. Shipped to the processor practically water-free (and diluted to working concentration on arrival), Celanese\* synthetically produced Acetic Acid saves on freight, handling, and storage. What's more, it is helping to end quality variation and spoilage in dyeing



For product improvement... for production efficiency...

### FIND THE ANSWER

... with Celanese\* Chemicals

To meet industry's fast changing needs for basic materials, Celanese has stepped up its program aimed at (1) increased production of organic chemicals . . . (2) a consistent price structure . . . (3) short-cutting chemical forms.

This program is solidly based on virtually unlimited natural resources for hydrocarbons and direct processing methods. These enable Celanese to bring vital chemicals "on stream" with minimum delay. A nation-wide distribution system meets the most rigid schedules. And Celanese technical service "punches the clock" at manufacturers' plants, to help make basic materials work better.

If you are a manufacturer "in a hurry," we would like to show you how Celanese can give you a faster start. Celanese Corporation of America, Chemical Division, Dept. 591-H, 180 Madison Avenue, New York 16, N. Y.

Acids Alcohols Aldehydes Anhydrides Hydraulic Fluids

Esters Glycols Plasticizers Salts Oxides Soivents



OR IMPROVED PRODUCTS In textiles, plastics,

agriculture, paper, surface coatings, electrical and building materials and equipment, pharmaceuticals.

### MATERIALS

(Continued from preceding page)

schedules. Gives high chemicalsolvent-, mar-resistance.

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(Vehicles for textured finishes are products of Midland Chemical Corp., Dept. CP, 1771 Springfield St., Dayton 3, Ohio. Check CP 8410 opposite last page.)

### Four more dyes to line

Black K Salt, a stabilized diazonium salt, produces jet black shades or cotton and viscose rayon when it is combined with Naphthols AS-BG, AS-BS, and AS-SW. Reddish-black shades are obtained when coupled with naphthols.

Alizarol Verdon S, non-dusting chrome dye, gives subdued bluishgreen shades to wool.

Solantine Green BL, non-dusting, fast-to-light direct dye, has high solubility and yields moderately bright shades of green on cotton, viscose, leather.

Carbanthrene Black Brown VA Paste, an anthraquinone vat dve. produces blackish brown shades on cotton and rayon.

(Dyes are products of National Aniline Div., Allied Chemical & Dye Corp., Dept. CP, 40 Rector St., New York 6, N.Y. Check CP 8411 opposite last page.)

### Offers pelleted zinc oxide

Zinc oxide in pelleted form should help reduce handling, storage, and processing costs.

(Protox-267 is a product of The New Jersey Zinc Sales Co., Inc., Dept. CP, 160 Front St., New York 38, N.Y. Check CP 8412 opposite last page.)

For more information on product at left, specify CP 8413
... see information request blank opposite last page.

AUG

### Produces high quality paint at low raw material cost . . .

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vehicle has low viscosity, maximum flexibility, easy working properties

Uses: Properly formulated, vehicle will produce top quality one-coat exterior paint or good lowcost competitive product with proportionately good properties.

Features: Tested in marine topside paint, it has shown excellent wearability with no cracking, chipping, or peeling. Vehicle has low viscosity, maximum flexibility, and easy working properties.

Description: 1-CHP Vehicle is a specially processed linseed oil with semi-thixotropic viscosity, improved water-resistance, and high mineral thinner tolerance.

(Processed linseed oil vehicle is a product of Brown-Allen Chemicals, Inc., Dept. CP, PO Box I, Port Richmond, Staten Island, N.Y.... or for more information check CP 8414 on handy form opposite last page.)

### Anhydrous sodium metasilicate provides high detergency

Designed for detergent uses, improved anhydrous sodium metasilicate has 51% total alkali content. It is readily soluble, safe and easy to handle, and is a product of Silicate, Detergent, Calcium Div., Diamond Alkali Co., Dept. CP, 300 Union Commerce Bldg., Cleveland 14, Ohio. . . . or for more information check CP 8415 on handy form opposite last page.



Want a quick "locator" for specific chemical materials discussed in this issue...?

The alphabetical Product Directory (starting on page 210) will give you a handy page reference to all articles and advertisements.

# HARSHAW

industrial and laboratory

# chemicals

Electroplating Salts, Anodes and Processes...

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...Vinyl Stabilizers...Ceramic Opacifiers and
Colors...Fluorides...Glycerine...Preformed
Catalysts, Catalytic Chemicals...Synthetic
Optical Crystals...Agricultural Chemicals
...Fungicides...Chemical Commodities.



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### FREE!

This sixteen page book "Harshaw Chemicals for Industry and Laboratory" describes Harshaw's major activities.





When inquiring check CP 8416 opposite last page

### FAST DELIVERY



TANK-CAR



**DRUM' QUANTITIES** 

# Du Pont

**Fatty Alcohols** 

Quick delivery can be made on "Lorol" fatty alcohols in tank cars and containers of various capacities and types. Your Polychemicals representative will be glad to discuss your specific requirements with you.

Her Things for Better Living

... through Chemistry

**Polychemicals** 

CHEMICALS • PLASTICS

# Specify DU PONT **LOROL**°

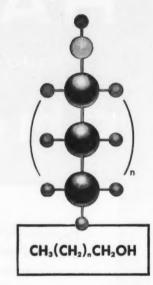
**Fatty Alcohols** 

CAN BE ESTERIFIED with acids in the presence of a catalyst.

CAN BE OXIDIZED to give the corresponding aldehydes. Further oxidation yields the

CAN BE DEHYDRATED over an aluminum oxide catalyst to yield corresponding olefins.

ARE NON-CORROSIVE.



### PRINCIPAL USES

These versatile straight-chain alcohols have wide application as chemical intermediates in the preparation of certain pharmaceutical, synthetic detergent and cosmetic products. "Lorol" fatty alcohols are also used as intermediates in the preparation of: lubricating oil additives; textile finishing, softening and anti-foam agents; polymerization modifiers used in synthetic rubber

manufacture; and plasticizers for plastics. They also find application in the leather and paper industries and have excellent possibilities for uses in other industries.

### **GENERAL ADVANTAGES**

Du Pont "Lorol" fatty alcohols are closely controlled with respect to hydroxyl, iodine, acid and ester numbers and feature a high degree of uniformity.

### AVAILABLE FOR IMMEDIATE SHIPMENT ARE:

"LOROL" 5 AND 7—mixtures made up principally of lauryl and myristyl alcohols. "LOROL" 24-normal cetyl alcohol.

"LOROL" 28—normal stearyl alcohol. (In U. S. P. and Industrial Grades.)

To obtain full information on Du Pont "Lorol" fatty alcohols, just mail the coupon below, or write us on your letterhead today.

### Nonselective herbicide for industrial use

scrub-resistance.

site last page.)

MATERIALS

Uses:

Features:

water mixtures. Description:

Both the solid and liquid forms

of acetylated monoglycerides

Compounds are safe for cosmetic uses.

The solid is easily emulsified; the liquid is completely miscible with castor oil and with alcohol-

ides are available in semi-commercial quantities. One form is a solid at room temp, while the other

(Myvacet glycerides are a product of Distillation Products Industries, a Div. of Eastman Kodak

Co., Dept. CP, Ridge Rd. West, Rochester 3,

N.Y. . . . or for more information check CP

Polyco 577G for interior flat paints gives outstanding water-resistance. It is a 55%-solids

anionic emulsion that will not blush when wet

and has good color-stability. It is borax-compatible.

Polyco 612, designed for coatings and adhesives

which require a high-solids compound, is a 60%-

solids anionic polyvinyl acetate emulsion that's

borax-compatible. It has good water- and scrub-

resistance and is color-stable at high temperatures.

Polyco 679, for use in non-discoloring high-tem-

perature heat-seal adhesives, is a 55%-solids an-

ionic emulsion. Easily compounded with starch

and natural gums, it nevertheless has good water-

resistance. It is borax-compatible and has good

(Polyvinyl acetate emulsions are products of Poly-

co Dept., Chemical Div., The Borden Co., Dept. CP, 101 Foster St., Peabody, Mass. . . . or for more

information check CP 8419 on handy form oppo-

is a clear, practically colorless liquid.

8418 on handy form opposite last page.)

Polyvinyl acetate emulsions

for coatings, adhesives

Both forms are free from greasiness.

Distilled acetylated monoglycer-

are free from greasiness

An emulsifiable liquid, Baron contains four pounds/gal of tech 2-(2,4,5-trichlorophenoxy) ethyl 2,2-dichloropropionate. Applied at 1-2 pints/sq rod, herbicide is effective against almost all perennial grasses, herbaceous plants. Both parts of molecule exert herbicidal action.

(Industrial herbicide is a product of The Dow Chemical Co., 1000 Main St., Midland, Mich. . . . or check 8420 on handy form opposite last page.)

### E. I. du Pont de Nemours & Co. (Inc.) Polychemicals Dept. 588, Wilmington 98, Del. Which of those Please send me full information on Du Pont "Lorol" other chemicals are Fatty Alcohols. I am particularly interested in using you interested in? "Lorol" for the following applications:. Adipic Acid Crystal Urea Position\_ ☐ Diglycolic Acid ☐ Hydroxyacetic Acid HYTROL® O Cyclohexanone ☐ HEXALIN® Cyclohexanol State.

When inquiring check CP 8417 opposite last page

### Insoluble matter is < 0.005% in reagent grade anhydrous cadmium sulfate

er

Reagent grade anhydrous cadmium sulfate is available in high purity, with insoluble matter <0.005% and chloride <0.001%. Uses include research in industrial phosphors, determinations of organic insecticides, and blood serum and protein analysis.

(Reagent anhydrous cadmium sulfate is a product of Fisher Scientific Co., Dept. CP, 717 Forbes St., Pittsburgh 19, Pa. . . . or for more information check CP 8421 opposite last page.)

### Highly reactive powder form of CaH<sub>2</sub> for production of powdered metals and alloys . . .

hydride is made by reacting Na and CaCl2 with H2 at high temperature

For production of powdered metals and alloys, and a drying agent for gases and liquids, as well as a condensing and reducing reagent.

Powder is highly reactive. In preparation of sheet titanium, samples have shown properties and analysis equal to titanium metal produced by the Kroll process.

Description: Hydrimix contains 25% calcium hydride in very fine powder form, dispersed through a powdered mass of solid sodium chloride. It is made by reaction of sodium and calcium chloride in a hydrogen atmosphere at black heat temperatures. If concentrated CaH2 is required, the NaCl is easily removed by dissolving with anhydrous ammonia.

(Powdered CaH2 is a product of Metal Hydrides, Inc., Dept. CP, 12-24 Congress St., Beverly, Mass. . . . or for more information check CP 8422 on handy form opposite last page.)

### Shows success as release agent in rubber processing operations

Polyethylene has proven to be an excellent mill and calender release agent for neoprene and Hypalon compounds, as shown by recent tests in rubber processing operations. It is especially effective when roll temp exceeds 140°F.

(A-C Polyethylene is a product of Semet-Solvay Petrochemical Div., Allied Chemical & Dye Corp., Dept. CP, 40 Rector St., New York 6, N.Y. . . or for more information check CP 8423 on handy form opposite last page.)





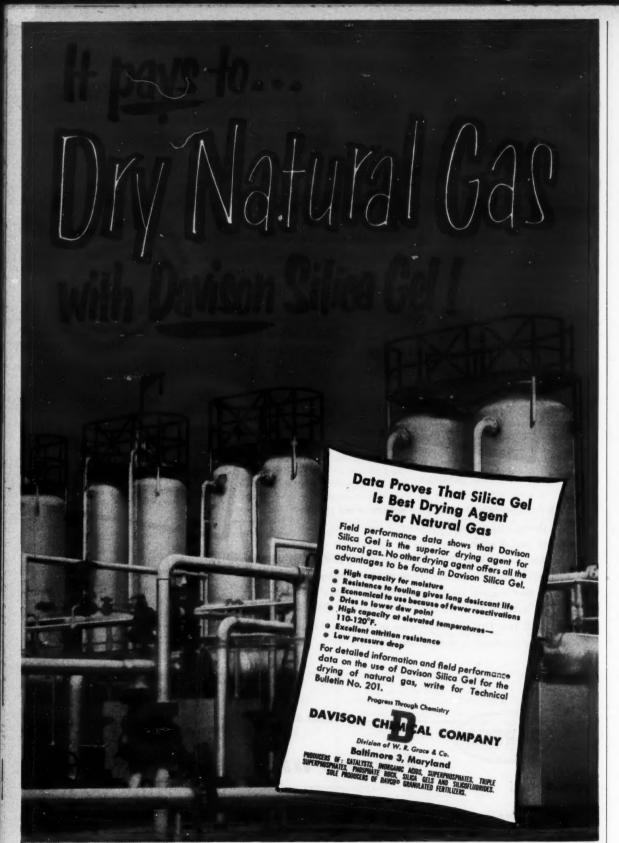
### Pure Carbonic Company

NATION-WIDE "DRY-ICE" SERVICE-DISTRIBUTING STATIONS IN PRINCIPAL CITIES GENERAL OFFICES: 60 EAST 42ND STREET, NEW YORK 17, NEW YORK

PURE CARBONIC COMPANY is a division of AIR REDUCTION COMPANY, INCORPORATED Principal products of other divisions include: AIRCO-industrial gases, welding and cutting equipment and acetylenic chemicals OHIO-medical gases and hospital equipment NATIONAL CARBIDE—pipeline acetylene and calcium carbide COLTON—polyvinyl acetates, alcohols and other synthetic resins.

When inquiring check CP 8424 opposite last page

NG



When inquiring check CP 8425 opposite last page

# High boiling liquid plasticizer approved for use in plastics that contact foods . . .

compound is odor-free and economical to use

Uses: As a plasticizer in films for food and beverage containers and as a component of plastic meat wraps.

Features: Compound is odor-free and economical. It has been accepted by the Food and Drug Administration for container applications and by the Bureau of Animal Industry, USDA, and Office of Quartermaster General for use in meat wraps.

**Description:** Citroflex A-4, acetyl tributyl citrate, is a high boiling liquid of low toxicity. It is soluble in most organics.

(Citric acid plasticizer is a product of Chas. Pfizer & Co., Inc., Dept. CP, 630 Flushing Ave., Brooklyn 6, N.Y.... or for more information check CP 8426 on handy form opposite last page.)

### Ten more organic chemicals

4,5-Dihydroxy-m-benzenedisulfonic acid disodium salt, a sensitive reagent for iron and titanium.

Dipropionin (Pract.), BP 112-114°C @ 0.5 mm, a synthetic "fat," is a mixture of 1,2- and 1,3-dipropionin.

3-Amino-1-propanol (Pract.) has MP of 10-12°C. 2-n-Butylaminoethanol (Pract.). MP  $-4^{\circ}$  to  $-2^{\circ}$ C.

1-Docosanol (Tech.). MP 62-64°C.

N-Ethyl-n-butylamine (Pract.). BP 110-112°C.

Methyl benzenesulfonate. BP 149-151°C @ 13 mm.

Nitrocyclohexane (Pract.), BP 81-83°C @ 10 mm.

Pyromellitic acid (Pract.). MP 280-284°C.

Vinyl butyrate (Pract.). BP 115-117°C.

(Organic chemicals are products of Distillation Products Industries, a Div. of Eastman Kodak Co., Dept. CP, 343 State St., Rochester 3, N.Y. . . . or for more information check CP 8427 on handy form opposite last page.)

### Non-staining rubber antioxidant

General chemical and physical properties, specs, compounding characteristics, and uses of Antioxidant 425 are present in four-page bulletin issued by Intermediate & Rubber Chemicals Dept., American Cyanamid Co., Bound Brook, N.J. When inquiring specify CP 8428 on handy form opposite last page.

AU

### Shows interest as monomer, chemical intermediate . . .

physical properties of polymers can be varied

Uses: Compound is of primary interest as a monomer for polymerization and copolymerization. It is also a valuable intermediate.

Features: By using various monomers and adjusting reaction conditions, polymers can be made which vary in physical properties from hard brittle resins to soft, internally plasticized, elastic materials.

Substitute succinates are readily made by addition of halogens, aldehydes, thiols, and similar compounds. The compound readily undergoes the Diels-Alder reaction.

Description: Dibutyl fumarate is a clear, mobile liquid, classified as "practically non-toxic." Crystallizing point is -18.9°C. It boils at 285°C (@760 mm) and flash point (COC) is 275°F. It is available in semi-commercial quantities.

(Dibutyl fumarate is a product of Organic Chemicals Div., Monsanto Chemical Co., Dept. CP, 12th & Delmar, St. Louis 4, Mo. . . . or for more information check CP 8429 opposite last page.)

### Better light fastness, hiding power, and tinting strength shown by molybdenum orange

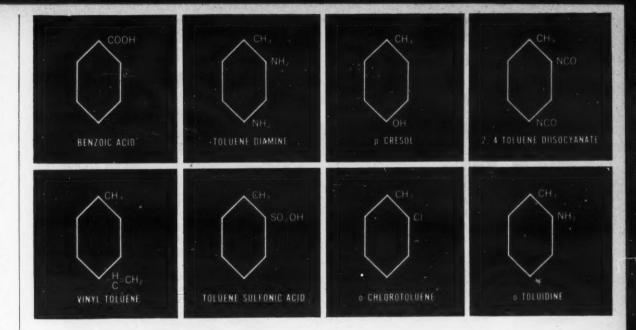
A significant improvement in orange pigments is seen in test results of full color paint formulations. Molybdenum pigment did not darken readily in exposure tests. Pfund cryptometer tests indicated that hiding power is superior. When used for tinting strength, pigment required amounts equal to about one-tenth that of chrome orange to produce similar shades.

(Molybdenum orange is a product of Climax Molybdenum Co., Dept. CP, 500 Fifth Ave., New York 36, N.Y. . . . or for more information check CP 8430 on handy form opposite last page.)

### Economical precursor for diazomethane

N-Methyl-N-nitroso-p-toluene-sulfonamide, called Diazald, is a safe, stable, inexpensive precursor for diazomethane. A yellow, crystalline solid melting at 58-60°, compound has low toxicity. An explosive decomposition has never been encountered.

(Diazald is a product of Aldrich Chemical Co., Inc., Dept. CP, 3747 N. Booth St., Milwaukee 12, Wis. . . . check CP 8431 opp. last page.)



If you produce these or related compounds ...

# SUN TOLUENE WILL GIVE YOU HIGHER YIELDS...MINIMUM IMPURITIES

The increased use of toluene as a chemical raw material created the demand for a purer product. Sun met this demand last year when it built its new aromatics plant.

Since then, industries using new high purity Sun Toluene have been reporting increased plant efficiency...better quality in their finished products...increased life of many of their catalysts.

Sun Toluene has a purity (mol. percent.) of 99.9. The bromine index test, a most sensitive measure of olefins, typically shows negligible results. Typical results from the isatin test show that Sun Toluene is thiophene-free.

In addition, Sun Toluene is guaranteed to contain less than 0.5% paraffins...well below the ASTM maximum of 1.5%. As a matter of fact, by the ASTM Test, Sun Toluene normally contains no paraffins whatsoever.

### TYPICAL TESTS

Paraffins						Nil
Bromine Index (un	sat	ura	tes	).		Negligible
Acid Wash Color, A	STI	M				1
Distillation Range	٥	٠			٠	0.6 C incl. 110.6 C
Sulphur, Wt. % .						0.001
Mol. % Purity .		,				99.9
Thiophene (Isatin)	•					Negative

For complete specifications and more information about Sun Toluene see your Sun representative... or write for Technical Bulletin #27. Address SUN OIL COMPANY, Philadelphia 3, Pa., Dept. CP-8.

### INDUSTRIAL PRODUCTS DEPARTMENT

# SUN OIL COMPANY

PHILADELPHIA 3, PA.

In Canada: Sun Oil Company, Ltd., Toronto and Montreal





When inquiring check CP 8433 opposite last page

# NO MATTER WHAT YOUR LEAKING JOINT PROBLEMS ARE



IT MAY PAY YOU
TO TRY LEAK LOCK
LIKE OTHER
MAINTENANCE MEN

Leak Lock clings in tough films that stretch rather than break HAVE DONE

For 5 years, Leak Lock has been surprising skeptical people who didn't expect to find a "barrier" for an "impossible-to-hold" material. They were surprised at the broad scope of its capabilities.

Leak Lock is being ordered regularly by a welldiversified list of important concerns who regard it as a "find" for special uses.

Send for information and a sample. And here's a tip: Don't depend on a lab. test. Try it on the actual job, and then you will know.



HIGHSIDE CHEMICALS COMPANY
A UNIT OF STEWART INDUSTRIES INC.
16 COLFAX AVENUE CLIFTON, N. J.

When inquiring check CP 8434 opposite last page

Cut your materials costs with

PICCOPALE

AVAILABLE IN VERY
LARGE QUANTITIES

completely new 100% petroleum polymer, versatile, compatible, permanent.

Pennsylvania Industrial Chemical Corporation operates an exceptionally well-equipped laboratory for technical an exceptionally well-equipped laboratory for technical comparison.

Pennsylvania Industrial Chemical Corporation operates an exceptionally well-equipped laboratory for technical research involving the use and application of Picco products. The extremely low cost of PICCOPALE, and its availability in enormous quantities make this new type of petroleum resin ideal for use as a basic raw material. It is chemically inert—not affected by acids and alkalies; moisture-proof; compatible with waxes, rubbers, polyethylene, coumarone-indene resins, phenolics, rosins, many alkyds, vinyls, drying oils and many other materials; soluble in naphthas, chlorinated and other solvents. Available in liquid solution or in flaked or solid form. WRITE for complete data, specifications and samples.

Clairton, Pennsylve	inia
Please send bulletin d	lescribing PICCOPALE and samples of
grade for (application	
ne ansithelitions an	Wilesman 12
Name	Position
Сотрану	
Address	SECTIONS
Dannauluania I	eductrial Chamical Corn
Pennsylvania i	ndustrial Chemical Corp
Clairt	on, Pennsylvania
	Plants at:
Clairton, Pa.; West	t Elizabeth, Pa.; and Chester, Pa

New York, Chicago, Philadelphia, Pittsburgh, Detroit

nia Industrial Chemical Com

When inquiring check CP 8435 opposite last page

### MATERIALS

### Sodium lauryl sulfate of high purity

Uses: In dentifrices, pharmaceuticals, cosmetics.

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Features: Product has very low proportion of both free fatty alcohol and sodium chloride. Because of this, foaming and viscosity can be better controlled. It has absence of taste, and in toothpaste it minimizes possibility of corrosion where aluminum tubes are used.

Description: Sipon WD Crystals are highpurity sodium lauryl sulfate.

(Sodium lauryl sulfate is a product of American Alcolac Corp., Dept. CP, 3440 Fairfield Rd., Baltimore 26, Md. . . . or for more information check CP 8436 on handy form opposite last page.)

### Standardized low-silica solutions for demineralizing systems . . .

prepared and analyzed under approved methods

Uses: In conjunction with analytical work in operation of silica removal demineralization systems.

Features: Standards are in low-silica range. They simplify the establishment of a demineralizer control laboratory.

Description: Low-silica standards available are:

Range (ppm as SiO <sub>2</sub> )	Accuracy
0.9-1.2	± 0.05
0.09-0.2	± 0.01
0.006-0.03	± 0.006

They are prepared and analyzed in accordance with methods published by the Joint Research Committee on Feed Water Studies and Armour Research Foundation.

("Low Silica" Solutions are products of Cochrane Corp., Dept. CP, 17th and Allegheny Ave., Philadelphia 32, Pa. . . . or for more information check CP 8437 opposite last page.)

### Chart compares the properties of styrene molding materials

Wall chart measuring 15 x 24" compares properties, specs, applications of Lustrex styrene molding compounds of general-purpose, medium-impact, high-impact, and special-purpose formulations. Molding conditions are given. Chart is in three colors.

Chart 3031 is issued by Plastics Div., Monsanto Chemical Co., Dept. CP, Springfield 2, Mass. Check CP 8438 opp. last page.

low cost

### Low penetration for emulsifiable wax

Uses: In liquid floor polishes.

Features: Helps overcome film softness of wax, improving brightness and scuff-resistance.

Penetration characteristics are good.

Description: Petronauba D, an emulsifiable petroleum wax, has a penetration of 3.5 @ 77°F and 28.0 @130°F. The highly refined wax melts at 192.2°F.

(Emulsifiable wax is a product of Bareco Oil Co., Dept. CP, PO Box 2009, Tulsa, Okla. . . . or for more information check CP 8439 on handy form opposite last page.)

### Offers brick defoamer for paper mills

in

n

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Very small quantities of Defoamer 4 will control most foam conditions encountered in papermaking systems. Each 2½-lb brick makes 40 gal of 0.75% solids dispersion.

(Brick defoamer is a product of Paper Makers Chemical Dept., Hercules Powder Co., Dept. CP, 940 Market St., Wilmington 99, Del. ... or for more information check CP 8440 on handy form opposite last page.)

### Pharmaceutical intermediate

γ-Dimethylaminopropyl chloride hydrochloride, a relatively non-toxic compound of interest as an intermediate to the pharmaceutical industry, is now available on commercial scale from Michigan Chemical Corp., Dept. CP, St. Louis, Mich. . . . or for more information check CP 8441 on handy form opposite last page.

For more information on product at right, specify CP 8442
. . . see information request blank opposite last page.

### FAMOUS LIGHTHOUSES OF AMERICA



PORTLAND HEAD LIGHTHOUSE, Maine, was built between 1787 and 1790
by two Portland masons engaged by George Washington, who instructed them
to use rubblestone taken from fields and shores. During the Civil War,
when raids on shipping required sighting the light from
greater distances, the tower was raised 8 feet. Today it stands 80 feet
above land and 101 feet above water at the southern entrance to
Portland Harbor. It is one of the four Colonial lighthouses
that have never been rebuilt.

A Landmark of Quality in the field of electrochemicals is the name Niagara Alkali Company. First to produce several of these important chemicals in America, Niagara is a pioneer in their development and application. You can rely on Nialk® Liquid Chlorine, Nialk Caustic Potash, Nialk Carbonate of Potash, Nialk Paradichlorobenzene, Nialk Caustic Soda, Nialk TRICHLORethylene, Niagathal® (Tetrachloro Phthalic Anhydride).

## ALKALI COMPANY

60 East 42nd Street

New York 17, N.Y.

# Introducing

# **NEW ALKATERGES**



### Compare the physical properties of these new additions to the CSC family.

Physical Properties	Alkaterge C	Alkaterge A	Alkaterge E	Alkaterge T
Color, Gardner (1933)	15	7 .	7	7
Solidification Point, °C	-40	-41	-50	59
Specific Gravity @ 20/20°C	-	0.885	0.926	-
Specific Gravity @ 25/25°C	0.925	0.883	0.924	-
Wt. per US Gallon @ 68°F, lbs	7.71	7.37	7.72	-
Coefficient of Expansion, per 1°F	0.00067	0.00061	0.0043	-
Refractive Index. na @ 25°C	-	1.4631	1.4738	-
Viscosity: Saybolt Universal @ 100°F, sec Centistokes @ 100°F	71*	79.9 14.5	299 62	_
Interfacial Tension Against Water, dynes/cm: 0.1% solution in mineral oil	2	24.6 10.5	18.1 3.7	1.8
Surface Tension, sat. ag. sol'n. dynes/cm:	42	37.6	37.8	30.4
Flash Point, Cleveland Open Cup, °F	400	325	395	None
Solubility, ml/100 ml: In Water	0.005	0.005 3.8	0.4 2.56	0.01
	* at 96°F			

Now, Commercial Solvents offers three new surface-active agents that are closely related to ALKATERGE-C. Because of the latter's proven industrial usefulness, demand exceeds supply. Production facilities are being expanded and more will be available starting August 1955. Meanwhile, many of CSC's customers have found that ALKATERGE-A, -E, or -T do equally well or better in many of the jobs formerly accomplished by ALKATERGE-C. While they differ somewhat in individual properties, they should prove useful as auxiliary emulsification agents, antifoam agents, dispersing agents, spreading agents, pigment-grinding assistants, acid acceptors and in numerous other applications. Test all or any of these three new alkaterges for yourself. For complete information and a sample,

write to Market Development Department, CSC, 260 Madison Ave., N.Y. 16, N.Y.

CHEMICALS

When inquiring check CP 8443 opposite last page

### MATERIALS

### Makes chemical-resistant piping that has increased rigidity, heat-resistance . . .

polyethylene material can also be molded and formed into sheets and film

Uses: For making lightweight, strong films and sheets; extrusion of pipe and rods; molding.

Plastic combines rigidity, heat-resistance, good surface quality, and broad color possibilities. Electrical- and acid-resistant properties are good. It is machinable, has a less waxy surface than regular polyethylene, and can be printed.

Pipes made from the material are more rigid than those made of conventional polyethylene. Burst strength is also considerably better, as is lowtemperature impact resistance.

Description: Super Dylan polyethylene is an ethylene polymer, developed from basic European patents. Tests show that it resists environmental cracking, is dimensionally stable up to 250°F, and chemically-resistant, and will resist an impact of 32 ft-lb/in at -78°F. Processing is easy at temperatures about 50°F higher than those for conventional polyethylene. Small commercial quantities are available at present time.

(Super Dylan polyethylene is a product of Koppers Co., Inc., Dept. CP, Koppers Bldg., Pittsburgh 19, Pa. . . . or for more information check CP 8444 on handy form opposite last page.)

### Methanol for Karl Fischer moisture determinations

Methanol contains less than 100 ppm water, providing a satisfactory vehicle for samples and reducing consumption of Karl Fischer reagent used to pretitrate water content. Reagent is supplied in 30-lb drums.

(Alcohol Methyl AR Karl Fischer is a product of Mallinckrodt Chemical Works, Dept. CP, 2nd & Mallinckrodt Sts., St. Louis 7, Mo. . . . or for more information check CP 8445 on handy form opposite last page.)

### Primary plasticizer for PVC

Properties and description, processing and advantages of Benzoflex 2-45, a primary plasticizer for vinyl chloride resins, are given in detail in fourpage technical data bulletin available from Tennessee Products & Chemical Corp., Dept. CP, 8011 Empire State Bldg., 350 Fifth Ave., New York 1, N.Y. When inquiring specify CP 8446 on handy form opposite last page.

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A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries

### ATTENTION

### Users of Taxfree and Specially Denatured Alcohol

Now is the time for users of specially denatured alcohol to renew their basic permit (Treasury Department Form 1479) for 1956. It is also time for users of taxfree alcohol to complete and file with the Assistant Regional Commissioner - Alcohol and Tobacco Tax Division-their application (Form 1450) for renewal of their Taxfree Alcohol permit for 1956.

Permittees who withdraw industrial alcohol in drums should note that U.S.I. and most of the chemical industry will increase standard filling of drums to 55 wine gallons each (currently 54 gallons) at the start of 1956. It is recommended that total gallonage of renewal permits be calculated to cover withdrawals in multiples of 55.

If you require renewal forms or any assistance in their preparation, please call your nearest U.S.I. office.

### U.S.I. High Molecular Weight Polyethylene Will Coat Paper Too

U.S.I.'s Petrothene 200, an all-purpose polyethylene resin developed for extrusion of packaging film and molding of semi-rigid forms, exhibited some unexpected characteristics during tests recently. The resin was successfully extruded as a laminate for paper coating, an application usually reserved for lower molecular weight types. At the same time, the material was extruded

successfully as unsupported lay-flat tubular and flat film forms, the most demanding operation for high molecular weight types of polyethylene. Further tests are being conducted to confirm the unexpected versatility of Petrothene 200.

### **Chemical Producers Going** To New Drum Standard

As a move toward higher materials handling efficiency, more and more chemical and petroleum producers are going to drums with both openings in the head, none on the side. The drum commonly in use today has a twoinch opening on the side and a 34 inch opening in the head, and frequently complicates handling in a customer's plant. U.S.I. is switching to the new drum on some of its products within the next few months.

The new type drum meets the Universal Standard Drum Specifications as set up by the Petroleum Packaging Committee and the Steel Shipping Container Institute.

### METHIONINE CALLED "MIRACLE" AMINO ACID

Versatility of Methionine Leads to Increased Use in Pharmaceutical, Medical, Veterinary Fields: Is Now Playing Vital Role in Animal Nutrition

Outstanding results with methionine have prompted a leading medical authority to suggest that this essential sulfur amino acid may in the future be as important as today's "miracle" antibiotics. According to this authority. there are few materials, if any, with such unusual diversity in their medical uses.

### Ammonia Ups Efficiency of Lube Oil Refining

Where lube oil feed stocks run high in undesirable naphthenic acids, satisfactory removal by the usual solvent extraction method becomes highly uneconomical. An excessive amount of solvent must be used. Yields are cut.

According to a recent patent, the problem is now being solved by the addition of ammonia to the solvent-oil system. Neutralization numbers - measures of naphthenic acid content have been reduced to well below the acceptable 0.1mg. KOH per g. of oil, where values up to 0.2 had previously been obtained. Ammonia is used in amounts below one percent based on the volume of oil.

This is one of several new industrial uses for ammonia that have been revealed within the past few months. Year-round applications of this kind help to smooth out the extremely seasonal fertilizer demand curve which has caused concern to ammonia manufacturers anxious to maintain uniform production levels from month to month.

Right now U.S.I. and other ammonia producers are filling storage facilities left empty by the just-completed fertilizing season.

### Sodium-Butadiene Reactions Produce **New Chemicals**

Buna rubber derives its name from a BUtadiene-Na reaction developed in England and Germany simultaneously, and industri-ally important in Germany during the late 1920's. Inability to obtain high sodium surface area at that time resulted in poor control and led to a change in the process.

Today new butadiene-sodium reactions are reaching commercial importance. One reason for this renewed interest has been the development by U.S.I. of sodium dispersions - stable suspensions of microscopic sodium particles in inert hydrocarbon media. This new form permits controlled reaction temperatures, increased yields and decreased side reactions.

Recent patents have been issued covering new butadiene-

MORE

### **Essential to Growth, Metabolism**

Methionine is necessary for growth, repair and metabolism of all human and animal tissue. Chemically it is DL-2-amino-4-(methylthio) butyric acid.

Much of its versatility is attributed to the carbon-sulfur linkage and the labile methyl group. Newer techniques in biochemical research have brought out some of the following characteristics:

- . . Aids in converting dietary protein to tissue
- Maintains nitrogen balance
- Participates in sulfur metabolism
- Has trans-methylation activity
- Is a precursor of bile acids and improves liver function
- Helps rebuild damaged kidney tissue
- Speeds wound healing
- Helps overcome adverse effects of stress factors such as temperature extremes, disease, overmedication, etc.
- Increases antibody production
- Acts as a detoxifier, overcoming effects of many toxic compounds due to accidental ingestion, overmedication, tissue injury, heavy metals, etc.
- . Helps hormone activity

**Many Pharmaceutical Applications** 

Methionine is valuable for its detoxifying properties and for preventing fatty infiltration of the liver.

It has been used in formulas in



Crystals of DL-Methionine as seen under

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### U.S.I. CHEMICAL NEWS

1955

### CONTINUED

### Methionine

dermatology and cosmetics and has been found effective for treatment of acne and falling hair. Addition of methionine to infant formulas has been found helpful in overcoming diaper rash. Pediatric experience has shown that daily additives of 180 milligrams of methionine to infant formulas have produced optimum gains in weight. This has led progressive manufacturers to use it in specialized supplements for young children. It is also an important metabolite in geriatric preparations. Oral ingestion of methionine has en reported effective in removing warts. It has improved the ability of the eye to become adjusted to night vision, an effect found to last from 24 to 32 hours. Methionine has been found valuable in the treatment of obstetric complications associated with liver damage of the mother and newborn often due to Rh incompatibility.

### Essential in Healing

Trace studies with "tagged" compounds have proved that methionine plays an essential role in the synthesis of connective tissue and increases the rate of wound healing. Topical application of N-acetyl DL-methionine has helped in healing varicose leg ulcers which had not responded to other treatment.

### Aids in Metabolic Balance

Nitrogen retention studies show that metabolic balance is affected by methionine. This compound has been more effective than Vitamin B<sub>12</sub> for promoting weight recovery following protein starvation. Methionine reportedly assists in restoring normal metabolisic after experimental overdoses of thyroid hormone. Other experiments indicate that certain liver disorders and anemia can be alleviated by adding methionine to the diet. It has been tested and found effective for reduction of blood cholesterol levels. Methionine aids hormone activity and, according to recent reports, injection of methionine has produced significant response in experimental animals.

### **Necessary in Animal Feeds**

Feed manufacturers add methionine to various rations for increased growth and feed Trade Mark

efficiency. Methionine in dog food formulations makes more of the protein in the ration available for growth and maintenance of health

It has recently been reported that a direct relationship exists between methionine requirements and the energy level of the diet.

Such a direct relationship is of great importance in formulation of high energy rations. Price reductions of feed grade methionine in the last few years have made it even more practical to include optimum amounts of methionine in manufactured feed.



### **Alcohol Injections To Brain Curing Parkinsonism**

A New York doctor has devised an operation using absolute alcohol to relieve the uncontrollable tremor of Parkinson's disease. He inserts a plastic tube into the gray matter of the brain and injects procaine, which should check the tremor temporarily. If it does, he is sure the right spot has been reached, and absolute alcohol is then injected to do the job permanently. Of the first few cases, more than half have been free of symptoms for many months now.

Alcohol has been widely used as a nerve blocking agent and for many other medical and pharmaceutical applications. The new operation adds another to its varied functions as a medical tool.

### CONTINUED

### Sodium

styrene copolymers prepared with a dispersed sodium catalyst. Products based on these patents are now being marketed in the form of oils which can be converted to resinous materials at elevated temperatures. The recently announced U.S.I. Isosebacic\* acid is made by still another reaction between butadiene and sodium.

### TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing U.S.I.

Flaws on metal surfaces are being located by means of a penetrating red dye followed by a white developer which pulls the hidden penetrant to the surface, giving a red on white evidence of imperfections. (No. 1100)

Porous aluminum with uniformly ultra-fine pore size is now made by a unique powder metal-lurgy process. The material, with pore openings ranging from 5 to 150 microns, can be used as a filtration and gas dispersion medium formed and welded readily. (No. 1101)

A new type heavy-gage polyethylene liner for steel containers is available for installing as an integral part of the container during production. Electronically sealed, with closed top, the liner makes possible liquid shipping at reduced costs.

Odorless paints with excellent resistance to acids, alkalies and cleansers are now produced for food and other plants where odors hamper manufacture. They contain an odorless solvent specially distilled from petroleum. (No. 1103)

New products control static electricity during microscopic and analytical work and in the laboratory where flammable solvents are used. Small quantities are applied to synthetic textile clothing; and to surfaces in general. (No. 1104)

An acrylate-type elastomer has been developed with high resistance to petroleum and chemical hydraulic fluids and to ozone. It is recommended for hydraulic packings, hose liners, wire coatings and fabric impregnants. (No. 1165)

Two new radioactive carbon-14 compounds are now available commercially. They are cetyl-1-C-14 and stearyl-1-C-14 alcohols, useful for tagged detergent and metabolic studies. (No. 1106)

A thin protective coating for metal parts and assemblies has been developed to replace heavy viscous types. It provides maximum corrosion protection and moisture repellency, plus lubrication.

(No. 1107)

A new liquid laundry rinse reduces static and repels dirt. When added to final rinse water, the positively charged liquid attached to negatively charged fibers, makes clothes soft, fluffy and dirt repellent.

(No. 1108)

A new vinyl chloride extrusion compound contains a non-migratory type of plasticizer and a specially selected fungicide. It was developed specifically for the extrusion or molding of vinyl parts which must contact styrene. (No. 1109)

### PRODUCTS OF U . S . I

### **ALCOHOLS**

Butanol (Normal-Butyl Alcohol) Fusel Oil - Refined

Ethanol (Ethyl Alcohol) Specially Denatured—all regular and anhydrous formulas Completely Denatured—all regular and anhydrous formulas

Pure—190 proof U. S. P., Absolute—200 Proof Filmex\*—special proprietary solvent Solox\*—proprietary solvent regular and anhydrous

Ethyl Ether, U. S. P.

### ACETONE-A.C.S.

ANSOLS Ansol\* A Ansol\* PR

### ACETIC ESTERS

**Butyl Acetate** Ethyl Acetate—all grades Normal-Propyl Acetate

### OXALIC ESTERS

Diethyl Oxalate

### OTHER ESTERS

Digtol\*

### INTERMEDIATES

Acetoacetanilide
Acetoacet-artho-chloroanilide
Acetoacet-para-chloroanilide
Acetoacet-para-chloroanilide
Ethyl Acetoacetate Ethyl Benzoylacetate Ethyl Sodium Oxalacetate

### FEED PRODUCTS

Calcium Pontothenate (Feed Grade)
Choline Chloride Products
Curbay B-G\* 80
BL-Methionine (Feed Grade)
Niacin, U.S.P.
Piboffwin Concentrate. Riboflavin Concentrates Special Liquid Curbay\*
U.S.I. Vitamin B<sub>12</sub> and
Antibiotic Feed Supplements
Vacatone\* 40
Vitamin A, D<sub>3</sub>, and K<sub>5</sub> Products

### PLASTICS

Petrothene\*\* Polyethylene Resins OTHER PRODUCTS

Anhydrous Ammonia Caustic Soda Ethylene Liquid Chlorine Metallic Sodium DL-Methionine (Pharm.) N-Acetyl pt-Methionine Nitrogen Solutions Propionic Acid Sulfuric Acid Urethan, U.S.P.

\*Reg. U.S. Pat. Off. \*\*Reg. Pend.

### CHEMICALS

Division of National Distillers Products Corporation

99 PARK AVENUE, NEW YORK 16, N. Y.

BRANCHES IN ALL PRINCIPAL CITIES

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# Acrylic-type ester forms protective coatings . . .

these can be applied to metal, wood, fabrics, plastics

Uses: To form protective coatings that can be applied to metal, wood, fabrics, and plastics.

Features: When properly blended, material yields films of outstanding adhesion, hardness, flexibility, color-stability, and fast drying qualities.

Description: Acryloid B-66 (100%) is a polymeric acrylictype ester in solid, granular form. It has good compatibility with several film-formers. High film adhesion is obtained from a short bake period at 300°F.

(Acrylic-type ester is a product of Resinous Products Div., Rohm & Haas Co., Dept. CP, Washington Square, Philadelphia 5, Pa... or for more information check CP 8447 on handy form opposite last page.)

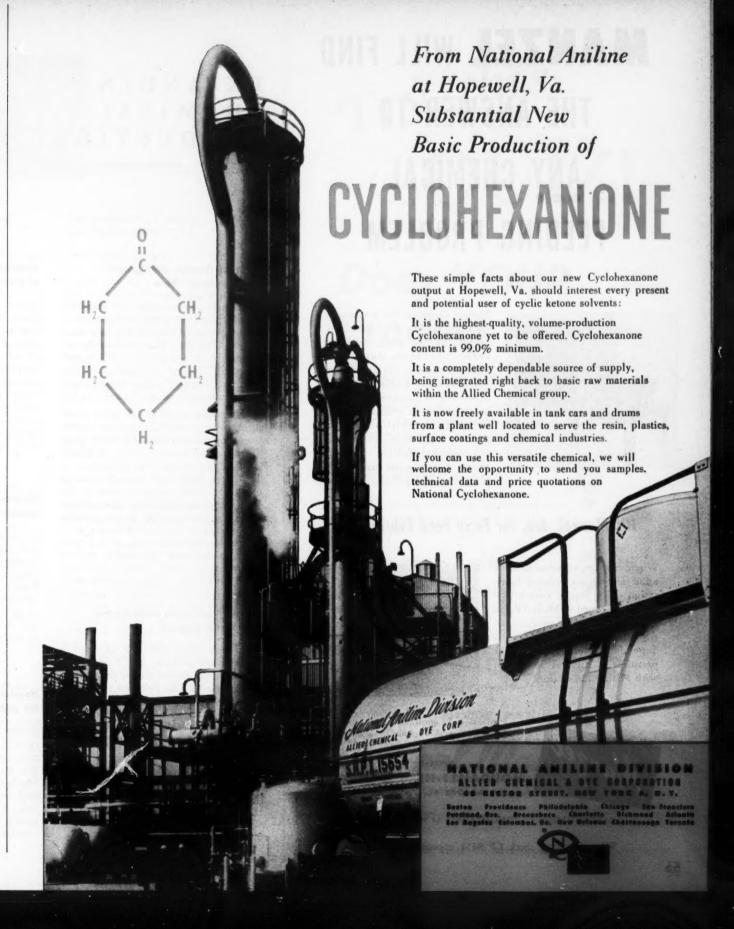
### Stability, low toxicity chief advantages of nitrosamide

Greater stability and much lower toxicity are the principal advantages of nitrosamide. Material is useful as a convenient source for the preparation of diazomethane in the laboratory.

(No. 7066 nitrosamide is manufactured by Organic Chemicals Dept., Distillation Products Industries, Dept. CP, div. of Eastman Kodak Co., Rochester 3, N. Y. . . . or check CP 8448 on handy form opposite last page.)

For more information on product at left, specify CP 8449 . . . see information request blank opposite last page.

For more information on product at right, specify CP 8450
. . . see information request blank opposite last page.



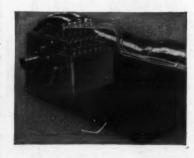
# MANZEL WILL FIND THE ANSWER TO ANY CHEMICAL FEEDING PROBLEM



Manzel Chemical Feeders have a wide reputation for their easy adaptability to a multitude of varied problems. But where standard models don't meet the need, Manzel engineers have repeatedly demonstrated an uncanny ability to produce special installations which do. For a soundly engineered answer to any chemical feeding problem phone, wire or write Manzel.

### It's Manzel, too, for Force Feed Lubricators

Where efficient, economical operation depends on pressure lubrication — in precise amounts — accurately timed — Manzel Force Feed Lubricators are your answer. Any number of points can be dependably lubricated under pressures as high as 30,000 psi with Manzel Lubricators.



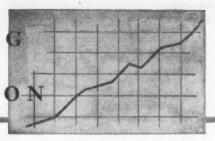


Professionally qualified engineering representatives throughout the country.

HOUDAILLE-HERSHEY CORP. 274 BABCOCK ST., BUFFALO 10, N. Y.

When inquiring check CP 8451 opposite last page

### EXPANDING CHEMICAL PRODUCTION



### Hercules finishes DMT plant for "Terylene" fiber

Hercules Powder company has completed \$4 million addition to its Burlington, N. J. plant for dimethyl terephthalate, basic material for "Terylene". Plant will supply over one million lb a month of DMT to producers of "Terylene" in Canada and other countries. "Terylene" is polyethylene teraphthalate, manufactured as "Dacron" in US.

Hercules plant is first in US to use a new air oxidation process. Du Pont uses another process in the only other US DMT plant. "Terylene" was invented in 1941, in Britain. Du Pont was licensed for development in the United States and Imperial Chemical Industries Limited obtained rights for the remainder of the world. Production of Hercules' new plant will be for the new \$22 million plant of Canadian Industries (1954) Limited at Millhaven, Ontario, and other foreign producers of "Terylene".

### Freeport will mine underwater Lake Pelto deposit

Sulfur from newly discovered salt dome in the Louisiana tidelands, first Freeport Sulphur Company deposit entirely under water, will be mined at Lake Pelto, 60 miles southwest of New Orleans. Tidelands dome deposit is beneath six to eight feet of water about a mile from the open Gulf, separated from it only by a narrow island.

Freeport Sulphur began prospecting operations near its Bay Ste. Elaine mine earlier this year. Drilling has progressed to the point where a decision was made to install facilities for mining the property. Freeport anticipates mining problems not previously encountered in the coastal marshlands.

### Additional 26 million lb of styrene annually

Present Baton Rouge, La., plant of Foster Grant, Inc., will more than double its present capacity of 24 million lb of styrene monomer. Additional capacity will provide over 50 million lb annually. Original plant was completed approximately a year ago. Captive supply of monomer was for Foster Grant's polymerization plant at Leominster, Mass. Additional production will be used to enter outside market. Process was developed in Germany and first used in this country by Foster Grant.

### Diamond now has two plants producing chromic acid

Second of two completely integrated chromic acid plants recently went on stream for Diamond Alkali Company at Painesville, Ohio. Diamond's other plant is located at Kearny, N. J. Chrome ore for the Painesville plant will be imported from Africa. Painesville location in northeastern Ohio on N.Y.C. and B & O will allow freight savings on midwest deliveries.

### Heyden spending \$4 million more for polyol alcohols

Heyden Chemical Company is expanding its capacity for pentaerythritol by 25 million lb, cost — \$4 million — with completion scheduled for the end of 1956. The new plant is fourth major expansion of Heyden in this field since building its first plant at Garfield, N. J. in 1939. The polyol alcohol is used in paints, enamels, resins, other surface coatings.

News about chemical materials in the US - plant construction, increased production . . . on stream now or planned for future

### First shipment of urea by Grace from Memphis nitrogen plant

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First carload of urea from Grace Chemical Company's new \$22 million petrochemical plant at Memphis was made in June. Plant, which makes both ammonia and urea, was formally dedicated in January, 1955. Ammonia section has been in production since December, 1954 and has exceeded designed capacity of 250 tons a day. Urea production is expected to reach rated capacity of 150 tons a day very shortly. Method is the Pechiney process using starting materials of ammonia and carbon dioxide.

### Firestone now world's largest producer of rubber

Firestone Tire & Rubber Company has become the world's largest producer of rubber since acquiring the two Government synthetic rubber plants at Lake Charles, La., and Akron, Ohio. Firestone is producing over a million lb a day total synthetic and natural rubber. An additional \$1 million-plus is being spent to increase production facilities at the two synthetic rubber plants. Further expansion is planned for both the synthetic-producing plants and the natural rubber plantations in Liberia.

### Armour grants three more licenses for fractionating tall oil

Armour and Company has granted three more licenses for fractional distillation of tall oil. Licensees are Newport Industries, Inc., Union Bag and Paper Corp., Hercules Powder Company. Newport Industries is already operating a plant at Bay Minette, Ala. Hercules announced last December it would build a plant at Franklin, Va. Union Bag will build a distillation plant adjacent to its paper mills at Savannah, Ga.

### Will complete \$2 million acid plant by mid-1956

Consolidated Chemical Industries, Inc. expects to have its new \$2 million contact-process sulfuric acid plant completed by mid-1956. Construction is being started immediately. Plant location at Le Moyne, Ala., is adjacent to Courtauld's (Alabama) Ltd. viscose rayon works. Sulfur will be brought by water to company docks on the Mobile River.

Consolidated has also placed in operation another spent sulfuric acid regeneration unit at its Houston plant. This unit is a twin to the one put in operation during May at Baytown, Texas. These two sulfuric acid regeneration units are the largest ever constructed.

### Multi-stage pulp bleacher will cost \$31/2 million

Brown Company broke ground for \$3½ million Kraft pulp bleachery at Berlin, N. H. in mid-June. Plant is expected to be in operation in about a year. Brown is concentrating all its operations in the Berlin area since selling its Canadian subsidiary. Method used will be multi-stage process developed in Brown's laboratories which uses chlorine dioxide. Day-Kesting process, also developed by Brown, will be used for making chlorine dioxide.

### Complete polymerization unit at Cedartown, Ga.

New polymerization unit has been installed at Nopco Chemical Company's Cedartown, Ga., plant. Unit will be used for large scale production of water-soluble polymers and resin emulsions. Products will be used at textile warp sizes, adhesive components and paper coating binders.

# Try this QUIZ!

# Does YOUR Product Need-

### **Heat Stability**

Magnesia insures your products against deterioration when incorporated into materials exposed to high temperatures. A dependable thermal stabilizer!

### **Neutralizing**

Magnesia is an effective neutralizing agent when used in acid systems requiring pH increase. Economical, too!

### **Greater Bulk**

Magnesia provides a means of increasing product volume without materially increasing total weight. Magnesia has an extremely low bulk density; an effective product extender!

General Magnesite offers services in practical applications of magnesia products for improvement of product quality and processing, and for cost reduction.

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# General Magnesite \* MAGNESIA COMPANY

P. O. Box 671, Norristown, Pennsylvania

When inquiring check CP 8452 opposite last page

# 95% to 99%

noise energy eliminated in Gas Regulation

BURGESS-MANNING PRS SILENCERS

are designed to stop nerve-wracking noise caused by pressure reduction operations in gas regulation.



The PRS Silencer in the photograph is installed in the gas regulator system of the gas mixing plant at the Lehigh Valley Gas Division, United Gas Improvement Company, Bethlehem, Pennsylvania. This regulator reduces natural gas pressures from 45 psig. to approximately 2 psig. Sound Surveys at this installation prove the PRS Silencer —

- Removes 95% to 99% of the noise energy.
- Reduces noise levels at critical outside locations by 18 to 25 db.
- · Eliminates the need for expensive pipe lagging.

### With PRS Silencers you gain in two big ways -

- Pressure reduction silencing with predictable
  results.
- 2. Initial savings in installation time and material,
- ... PRS Silencers do not restrict line flow.

They can be designed for any pressure range. They require no major modification in practice.

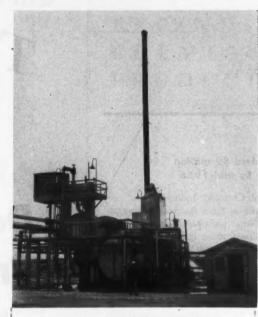
We offer you a specialized experience and engineering service.

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When inquiring check CP 8453 opposite last page

ideas — from other industries and the AEC...
new trends in research, processes, services



From 30 to 31 tons of high-quality sulfur are recovered from hydrogen sulfide by this unit in operation at Shamrock Oil and Gas



Part of the sulfur is shipped in molten form in tank cars to many points



Another portion of sulfur is run into blocks, crushed, and shipped by gondola car

Using hydrogen sulfide feed obtained from purification of 375,000,000 cu ft of sour gas per day, Shamrock Oil & Gas Company — ra

### produces pure petrochemical sulfur

Recovery process stops air pollution, provides yield of 88 to 90 %

A. V. BECKWORTH, Superintendent
McKee Plants, Sunray, Texas
The Shamrock Oil and Gas Corporation
with GORDON WEYERMULLER, Associate Editor

Recovery process at The Shamrock Oil and Gas Corporation, Sunray, Texas, produces 30 to 31 long tons of high-quality sulfur (99.9+% purity) per day from the sour gases. In addition, process which has provided yields of 88-90%, has stopped pollution.

Hydrogen sulfide processed by recovery plant is obtained from 375,000,000 cu ft of natural gas brought into plant per day. Sour gases contain 166 grains of H<sub>2</sub>S per 100 cu ft of gas, this being reduced to .012 grains per 100 cu ft by a Girdler Girbitol unit. H<sub>2</sub>S is stripped out of gas by absorption in 15% monoethanolamine at 210 psi.

The purified gas goes to pipelines for consumer use and the hydrogen sulfide to recovery plant for production of sulfur. Some residue gases from cat cracker are also mixed with residue gas in Girbitol unit, accounting for about six tons per day of the total sulfur production.

Previously the hydrogen sulfide gas was flared. Disadvantage of this procedure was that no return was obtained from the rich sulfur-bearing gases. Now the hydrogen sulfide is efficiently processed through the recovery unit.

### **Recovery Process**

1 — Hydrogen sulfide is cooled to 100° or less. A knockout drum decreases water content of gas from 40-50% to 5%.

2 — Gas goes to combustion chamber mixed with

AU

air in a ratio of 1.1 vol of gas to air. Automatic ratio controller maintains proper ratio of gas and air. About 1/3 of the H<sub>2</sub>S is burned here at a temperature of 1800-1900°F, forming SO<sub>2</sub>, H<sub>2</sub>O, and some sulfur. Overall reactions with regard to H<sub>2</sub>S conversion may be represented by the following equations:

(A) 
$$H_2S + 3/2 O_2 = SO_2 + H_2O$$

(B) 
$$2H_0S + SO_0 = 3S + 2H_2O$$

3 — Gases then pass to waste heat boiler where they are cooled to 710°F.

4 — Next gases go to bauxite catalyst bed where burned sulfur (SO<sub>2</sub>) and H<sub>2</sub>S form a major portion of the free sulfur, as shown in second equation. Exit temperature of molten sulfur here is about 800°F

5 — Material then passes to economizer, which is the preheater for water boiler.

6 — In next step the material goes through a second catalyst bed, entering at 560°F and leaving at 585°F. Function of second catalyst bed is to give maximum conversion of sulfur.

7 — Next step is the wash tower, which is equipped with water coils. Gases come in bottom and go out stack, while liquid sulfur flows down tower and out the bottom. Sulfur is cooled and recirculated through tower. Excess sulfur goes to pit at 280°F in molten form. In pit it is heated to about 290°F with steam coils. Sulfur must be kept between 250 and 300°F because it solidifies at 240 and becomes too viscous above 300°F.

8 — Part of sulfur is sold as a liquid in tank cars or tank trucks. Part is run into blocks, crushed, and shipped by gondola car.

A layer of coke gradually forms on bauxite catalyst and has to be removed every three months to maintain yield. To clean unit, flow of H<sub>2</sub>S is cut, remainder going to flare. Air is increased to ½% excess and temperature lowered to 1000°F or less. Carbon is burned off in six to eight hours. Immediately after cleaning, a yield of 95% is obtained, which gradually decreases until another cleaning is warranted.

Only a minimum of maintenance has been required on plant since it was placed to operation about four years ago.

(Recovery plant was constructed by The Fluor Corp., Dept. CP, 2500 S. Atlantic Blvd., Los Angeles 22, Calif.)

(Recovery process was licensed by Olin Mathieson Chemical Corp., Western Sulfur and Acids Div., Dept. CP, P. O. Box 991, Little Rock, Ark. . . . or for more information about manufacturer's product reader may simply check CP 8453A on handy form opposite last page.)



When inquiring check CP 8454 opposite last page

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# STAIL BOWS WILLSONS WILLSONS WILLSONS WINDIANS FVAPORATE MILK MILK MILK The intend Indust

Taylor Wiham, Wilson Milk Company (right), and John Pirtle, Standard Oil lubrication specialist, inspect oil stain on otherwise spotless floor, the result of previous oil leakage from overhead hydraulic bin loader. Leakage has been eliminated through use of STANODRIP Oil No. 29. Helping customers with lubrication problems is something John Pirtle is well equipped for. John has an engineering degree from Rose Polytechnic Institute, has completed Standard Sales Engineering School and has a number of years of field technical service experience. Customers find this experience and training pay off for them.

### STANODRIP Oil whips lubrication problem at Wilson Milk Company

MANAGEMENT OF THE Wilson Milk Company plant, Sheridan, Indiana, had a serious lubrication problem. STANODRIP Oil solved it.

In overhead bin loaders, hydraulic rams push powdered milk along conveyor chute to weighing machine. Leakage of lubricant from rams on the floor below caused a sanitary and safety problem. Packings were replaced every two months but leak-

age often recurred as early as two weeks after packing replacement.

Then Mr. Taylor Wiham, Assistant Superintendent, called in John Pirtle, Standard Oil Industrial lubrication specialist. Mr. Wiham asked about Stander Oil and its possible use as a solution to this lubrication problem. Decision was made to convert to Stander Oil No. 29. Old oil was removed, packings replaced and Stander installed.

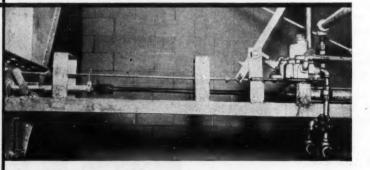
In more than 8 months since installation of STANODRIP Oil, there has been no leakage, no packing replacement. Hydraulic rams are lubricated without oil dripping or creeping.

Maybe Stanodrip Oil can serve you as it has Wilson Milk Company. Find out. In the Midwest, call your nearby Standard Oil lubrication specialist. Or contact Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.



STANDARD OIL COMPANY

(Indiana)



Three bin loaders like the one shown here dripped oil until converted to STANODRIP. No leaks have occurred in 8 months since. Previously, packings were replaced every two months. Even then leakage often recurred as early as two weeks after repacking.

### New ideas wanted by Air Force

As part of overall program for maintaining qualitative superiority of Air Force weapons, the Air Research and Development Command is intensifying its search for new ideas. Innovations are being invited from industry, universities, and private individuals. Proposals should include description, estimates of expected performance, and potential value.

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(Correspondence to ARDC should be addressed to Assistant for Innovations, RDTE, Headquarters, Air Research & Development Command, Box 1395, Baltimore 3, Maryland.)

### Aluminum, lead combined to make better anodes

Aluminum and lead are being joined to make aluminum-core lead anodes for chromium plating and sulfuric acid electrolytic processes. Although solid lead has been used extensively in the past, its low electrical conductivity has never made it an ideal anode.

The new anode, consisting of a rectangular aluminum bar clad with lead, is a joint development of Reynolds Metals Company and Knapp Mills, Inc. Advantages reported are:

- 1) High electrical conductivity.
- 2) Great dimensional stability.
- 3) Longer anode life.
- 4) Less weight.
- 5) Competitive price.

(Aluminum-lead anodes are available from Knapp Mills, Inc., Dept. CP, 23-15 Borden, Long Island City, New York . . . or for more information check CP 8455 on handy form which is located opposite last page.)



For more information on product at left, specify CP 8456 . . . see information request blank opposite last page.

### Pilot plant upgrades taconite low-grade ore . . .

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non-magnetic mineral rendered magnetic, concentrated by magnetic separation

Pilot plant located at Negaunee, Michigan, is believed to be first to demonstrate that Michigan non-magnetic taconite ore can be rendered magnetic and concentrated by magnetic separation. Crude ore contains about 30 per cent iron. Upgraded ore contains as much as 63 per cent iron. It takes about two tons of crude taconite to produce one ton of ore concentrate.

Solution to problem of magnetic conversion was provided by a fluidized solids reactor of type normally used for roasting sulfide ores. Crude non-magnetic ore, ground to minus-14 particle size, is chemically reduced to magnetite while suspended in a turbulent stream of hot reducing gas. Accurate temperature control and uniformity of reaction are maintained by the intimate contact of gas with the taconite particles in turbulent motion.

After leaving furnace, hot ore (now magnetic) is quenched in water. This shock-cooling produces cracks in the ore which facilitates fine grinding and better separation of iron mineral from the silica after grinding. Following three successive stages of grinding and magnetic separation, ore is concentrated to a high-grade fraction containing as much as 63 per cent iron. About half of the original ore is eliminated as a high-silica waste product.

Inasmuch as the concentrated ore is too fine for use in blast furnaces or for direct sintering, it is subjected to a pelletizing process. A rotary drum forms the concentrate powder into balls or pellets. These are hardened on the moving grate of a sintering machine that also consolidates individual pellets into grape-like clusters.

(Pilot plant is operated by Jones and Laughlin Steel Corporation, Dept. CP, Gateway Center, Pittsburgh 30, Pennsylvania.)

### Discusses bleaching processes for southern pulps

Three peroxide bleaching processes for southern pulps are described in eight-page bulletin. Text, diagrams, and tables discuss chemicals, equipment, techniques and results for a last-stage tower bleach, pulp dryer steep bleach, two-stage hypochlorite-hydrogen peroxide process.

Bul 65 is issued by Becco Chemical Division, Food Machinery and Chemical Corporation, Dept. CP, 34 Sawyer Avenue, Buffalo 7, New York. When inquiring specify CP 8457 on handy Reader Service slip which is located opposite last page.

# Carried 18,000,000 tons ...26 years in a cement mill

### It's a Link-Belt SS-856 steel chain

If your requirements demand a longlived elevator chain, use Link-Belt SS-856. This 6-in. pitch chain is made of high carbon steel sidebars with nickel alloy pins and bushings. Its average ultimate strength is 100,000 lbs. Other Link-Belt elevator chains, with ultimate strengths up to 200,000 lbs., are also available.

Link-Belt SS-856 is another example of Link-Belt's ability to apply the chain best suited to a specific set of conditions. No other single source offers you such a broad range of chains and sprockets...roller, silent, cast, combination, forged and fabricated steel types.

A call to your nearby Link-Belt office or authorized stock-carrying distributor will bring you all the facts about the complete line of Link-Belt chains and sprockets.

This Link-Belt SS-856 steel chain at a Pennsylvania cement mill was still serviceable after handling 18,000,000 tons of raw materials in 26 years. Those are Link-Belt cast buckets, too.

800 Ley bushed chain

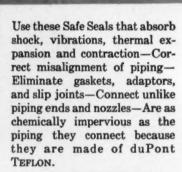


When inquiring check CP 8458 opposite last page

(and Flexural Tested, too, for Special Requirements)



To be sure that Chemiseal Expansion Joints and Flexible Couplings not only protect the costly chemical piping which they connect—but will also meet the service pressure requirements of every installation with a wide margin of safety—each is individually pressure tested before leaving the plant. And for special requirements, they are flexural tested as well.



Ask your Industrial Distributor or write for Bulletin FC-952.

UNITED STATES GASKET CO. Camden 1, New Jersey



FABRICATORS OF FLUOROCARBONS AND OTHER PLASTICS

Representatives in principal cities throughout the world

When inquiring check CP 8459 opposite last page

IDEAS

Instruments and feeder for waste pH control now packaged . . .

lime or other chemical delivered at controlled rate up to one ton

Dry chemicals such as lime are often used in treatment of water, sewage, and industrial waste. Effective use depends on measurement with manual or automatic control. Specific pH limits, for example, may be required for coagulation, etc.

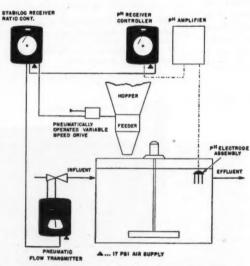
Where one ton per hour, or less, of lime or other dry chemical is needed, a packaged unit containing

the measuring equipment and automatic controllers has been designed. This uses a positive action dry feeder consisting of a grooved rotor driven by an electric motor. Dry pulverized material enters feeder from a hopper above, is carried through the feeder and discharged into a reaction tank.



Speed of grooved cylinder at right is governed by pH measurement

Rate of feed is a function of motor speed. This speed is changed by a pneumatically operated drive according to needs as sensed by pH electrodes.



Where flows vary widely this ratio system is used

Two arrangements are standard. One of these, for constant flow rate of waste, is designed to simply sense pH and add neutralizer to bring pH into line. Second arrangement also measures waste rate and involves ratio control to add neutralizer.



# KILL IT with a DOW CORNING SILICONE DEFOAMER

Use the space now wasted on foam to increase your output by as much as 100%. For example:

- production of vacuum concentrated food product increased by 60%
- refinery still through-put increased from 1500 to 2500 barrels per day
- yield of textile vat dyes increased by 100%

And you get increased production immediately without installing expensive new equipment. All you have to do in the case of most foamers is add a few parts per million of the water dilutable Antifoam AF Emulsion or, where solvents can be tolerated, a dispersion of Antifoam A. Both of these Dow Corning silicone defoamers are physiologically harmless. Both of them increase production • reduce processing time • eliminate the waste and fire hazard of boil-overs.

### see for yourself!

mail coupon today for free sample

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	Midland, Mich.,	Dept. 3208
Please send	me data and fr	ee sample of
Dow Corn	ing Antifoam A C	ompound

Dow Corning Antifoam A Compound			
or Dow Corning	Antifoam	AF	Emulsion
NAME		_	
COMPANY		_	
ADDRESS			
CITY	_IONE_	_ST	ATE-

When inquiring check CP 8460 opposite last page

CHEMICAL PROCESSING

Dry chemical is added with an accuracy of ±5 per cent by weight. Agitator disperses it into waste in a stilling tank.

(Instruments for control of this package are built by The Foxboro Co., Dept. CP, 38 Neponset Ave., Foxboro, Mass. . . . or for more information check CP 8461 on handy form which is located opposite

(Rotolock feeder is built by Omega Machine Co., Div. of B-I-F Industries, Inc., Dept. CP, 345 Harris Ave., Providence 1, R. I. . . . or for more information about manufacturer's product reader may simply check CP 8461A on handy form which is located opposite last page.)

### Forty-three firms pool resources to conduct basic research on distillation . . .

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hope to accomplish what individual companies cannot afford to do alone

Forty-three cooperating companies have pooled their resources and built an experimental distillation plant at Alhambra, California. The non-profit organization, known as Fractionation Research Incorporated (FRI). hope to accomplish what individual companies cannot afford to do.

The plant will study effects of tray design, system properties, and operating conditions on capacity and tray efficiency. Basic information may lead to revamping of existing equipment and designing of more efficient columns.

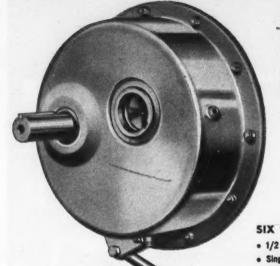
A 66-inch, three-tray simulator column will be used as screening device for testing bubble-cap trays and other contacting devices. Those that look promising will then be studied in a 48-inch, ten-tray column. First studies will be on bubble-cap trays because of present widespread use.

Binary systems will be used at first to test tray designs. Two such systems now in use are mixtures of n-butane with isobutane, and cyclohexane with n-heptane. Other systems which may be used are isopropyl alcohol with water, methyl ethyl ketone with secondary butyl alcohol, and hexane with absorption oil. Most of work will be with binary systems because analysis is simple and reliable. Sufficient studies will be made with multi-component mixtures to be sure that results of binary tests will apply to complex systems.

C. F. Braun and Company, of Alhambra, designed and constructed the test unit. Although entire program is under supervision of FRI technical director. the Braun firm, itself a member, will provide engineering and operating staff for the program.

(Information courtesy of C. F. Braun and Company, Dept. CP, 1000 S. Fremont Avenue, Alhambra, California.)

# Falk Steel Shaft Mounted Drives











### APPLICATIONS UNLIMITED

The range of applications to which the all-steel Falk Shaft Mounted Drive is ideally suited is so wide that complete listing is impracticable. The sketches above are included only to indicate a few typical installations where considerable speed reduction in limited space is an important advantage.

### SIX SIZES

- 1/2 to 30 hp
- Single or double
- Wide output speed range-420 to 10 rpm

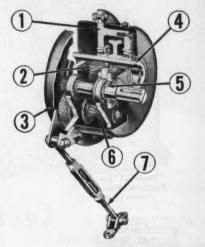


These versatile, NEW speed-reducing units

### save space, power, material and time

Here is the economical solution to the countless application problems requiring efficient speed reduction in limited space! The new Falk all-steel Shaft Mounted Drive-a modification of the universallyaccepted Falk Motoreducer design-embodies many exclusive structural and functional features which add up to better service, longer life and substantial savings.

This rugged, compact drive mounts directly on the driven shaft-a distinct saving in floor space. Its precision Falk helical gearing gives highest mechanical efficiency, with a resultant power saving. No adjustable motor bases or slide rails are required. Installation is simple and rapid-output speeds can be quickly changed; thus time is saved...Write to Department 247 for engineering bulletin, including selection and dimension details.



### FALK "In-Built" Factors... that give maximum efficiency, convenience and dependability

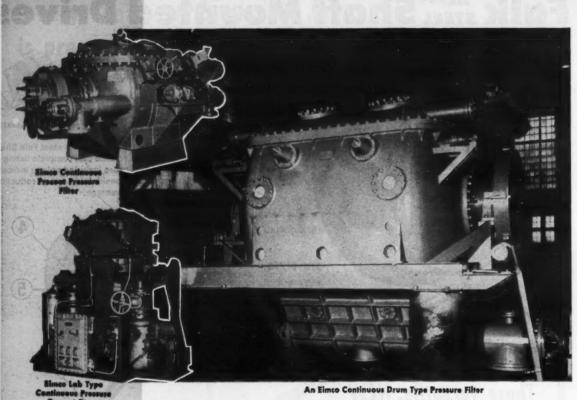
- 1 All-steel Frame, with more than double the rigidity of iron, supports all rotating elements.
- 2 Precision Helical Gears, designed and machined by Falk, rated to AGMA standards.
- 3 Pressed Steel Housings, whose sole function is to keep oil in, dirt out; easily removed for gear inspection without dismounting unit.
- 4 Through Hollow Shaft with counter bore provides for easiest installation or removal from driven machine shaft extensions.
- 5 Backstop can be furnished with the unit or added later for positive prevention of reverse rotation.
- 6 Positive Lubrication, continuous direct dip of revolving elements at all speeds.
- 7 Tie Rod and turnbuckle serve as anchor and facilitate V-belt or chain adjustment.

THE FALK CORPORATION, Milwaukee 8, Wisconsin MANUFACTURERS OF

- e Motoreducers
- Speed Reducers
- Flexible Couplings Shaft Mounted Drives
- High Speed DrivesSpecial Gear Drives
  - Single Helical Gears e Herringbone Gears
- Marine Drives
- Steel Castings

... a good name in industry

When inquiring check CP 8462 opposite last page



### Continuous Pressure Filtration

offers a means of solving difficult process problems which have heretofore been unanswerable.

These filters are offered only after the problem has been studied by Eimco's Research and Development Division and each filter station is then designed and constructed to handle each user's problem on an assured result basis.

Pilot plant operations are conducted on proportional sized filtration equipment of all types in Eimco's Research and Development Center or in the customer's own plant.

Successful production size installations based on findings made by Eimco's Research and Development Division prove the value of starting new flow sheets through this thorough and exhaustive method of testing to obtain all the facts.

Let us tell you more about Research in liquids-solids separation through filtration.

THE EIM CO CORPORATION
Salt Lake City, Utah—U.S.A. . Export Offices: Elmco Bidg., 52 South St., New York City

Hew York, H. V. Chingo, M. San Franches, Calif. Il Poss, Sur. Membryshow, Ale. Duboh, Minn. Kellegg, Ide. Bullimore, Md. Pittsburgh, Pa. Souttle, West



Televises internal moving parts of engines hidden by 18" of steel . . .

X-ray image is converted into optical image for televising or direct observation

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Highly-penetrating radiation from betatron in combination with a pattern amplifier allows continuous X-ray of moving metal parts. X-rays have been used for photographs of internal flaws in metal equipment. However, only "still" shots have been possible. Techniques and equipment for observing exactly what happens in operation have been lacking heretofore.



X-ray image on television screen of internal moving parts of engine. Piston and piston rod are above; crankcase is below

Pattern amplifier, acting as an X-ray intensifier, continuously detects, amplifies and displays low-intensity X-ray images. Major component of amplifier is the converter. X-ray images are received by a large, cylindrical, thallium-activated sodium iodide crystal and converted into optical images. Crystal emits visible light when bombarded with X-ray beams.

Images of metal parts hidden by 18 inches of steel or  $7\frac{1}{2}$  ft of concrete can be pictured using synchrotron with a pattern amplifier. Image can be seen directly, photographed with a camera, or televised if in a highly dangerous location.

Image displayed by the crystal is not persistent and follows the X-ray pattern received. Moving parts of engines, pumps and other metallic components can be seen directly.

(To obtain further information concerning pattern amplifier and X-ray television write National Bureau of Standards, U. S. Department of Commerce, Washington 25, D. C.)

When inquiring check CP 8463 opposite last page

### Offer porous aluminum test samples

Experimental quantities of porous aluminum and porous aluminum alloys are being offered for evaluation and application determination purposes. Material can be made in a range of thicknesses in excess of 1/32". Various sheets made thus far have uniform pore openings of from five to 150 microns.

Wide range of flow capacities for liquids and gases is reported with the porous light metal. Product has chemical properties equal to those of solid aluminum of comparable composition, and can be readily formed and welded.

(Process for making porous aluminum was developed by Micro Metallic Corporation, Dept. CP, 30 Sea Cliff Avenue, Glen Cove, New York . . . or for more information check CP 8464 on handy form opposite last page.)

### Multi-million-dollar lab is being constructed for carbon study

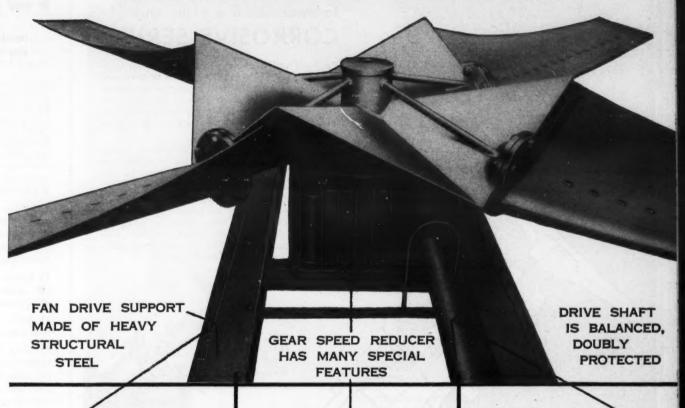
Multi-million-dollar research laboratory being built at Parma, Ohio (southwestern suburb of Cleveland), will engage in basic, exploratory work involving metallic and non-metallic compounds of carbon, as well as analogous compounds such as inter-metallics and semi-conductors.

Consisting of about 175,000 sq ft of floor space, laboratory is being constructed on a 66-acre site. When completed, it will accommodate about 200 research personnel. All major areas will be air-conditioned.

(Research laboratory is being built by National Carbon Company, A Division of Union Carbide and Carbon Corporation, Dept. CP, 30 E. 42nd St., New York 17, N.Y.)

For more information on product at right, specify CP 8465
. . . see information request blank opposite last page.

# PRITCHARD DRIVE ASSEMBLY IS BIGGER, BETTER, MORE STRONGLY SUPPORTED!



The fan drive support on all Pritchard cooling towers is one-piece, welded construction; made of heavy structural steel. After the gear speed reducer and driver are aligned, the driver and reducer are doweled for permanent alignment. This insures permanency of drive alignment regardless of settlement in the tower structure. The support transmits operating and dead load uniformly to the tower framework.

Pritchard gear speed reducers have many special features: superior shaft seals, heavier bearings, more conservative horsepower ratings, more rigid housings, more positive lubrication than any other gear speed reducer available. They are manufactured by old-line speed reducer makers especially for the rigorous service demanded on cooling towers and carry an AGMA label certifying their ratings.

Pritchard all metal drive shaft couplings require no lubrication. Drive shaft guards are furnished as standard equipment. The shaft is dynamically balanced, manufactured by one of the largest, oldest flexible coupling manufacturers in the country.

# new

Get your free copy of the new Pritchard brochure, "Answers to 15 Questions about Pritchard Induced Draft Cooling Towers." Fascinating reading. Profusely illustrated. Many tips, advice, unusual facts. Write for it today on your company letterhead.

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COOLING FOWERS GAS & AIR TREATING EQUIPMENT

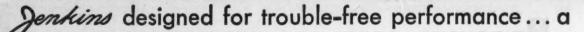
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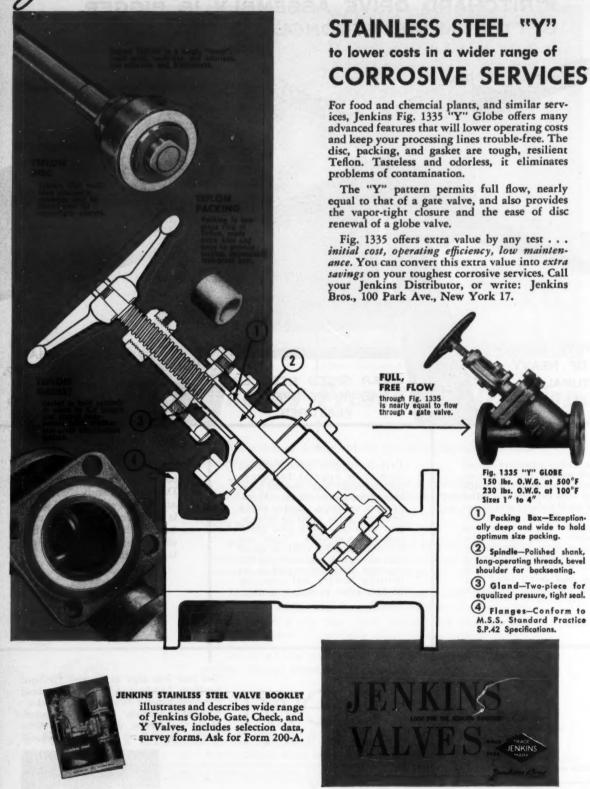
J.F. Pritchard & Co.

OF CALIFORN

Dept. 489 4625 Roanoke Parkway, Kansas City 12, Mo.







When inquiring check CP 8466 opposite last page

### Taking a plant inventory in one day

Involves only 12 steps, should work in any industry

Here's a method for taking physical inventory in your plant in a single day. It was perfected by Gene H. Kline, General Foods Corporation, and should work in any industry. Procedure involves 12 steps:

- 1) Draw an easily understood diagram of each floor area. Have enough copies made so that each of two counting teams may have a copy, at least for that section of floor for which they will be responsible. A supervisory team will also have a copy.
- 2) Divide manpower available for the actual counting into two-man teams and draw up assignment sheet showing areas each team is to count. (Provide for having each area counted twice by different teams. This makes for accuracy.)
- 3) List all classes of items to be counted in each area, indicating how each class is to be recorded; i.e., pounds, barrels, gallons, etc.
- 4) Select two-man team to supervise counting in each area or group of areas.
- 5) Have an established manufacturer of patched system tags supply you with a quantity sufficient for recording on a separate tag the quantity of each different class of material found stored in each separate area to be inventoried. Tags should be prenumbered in sequence.
- 6) Give to each supervisory team a quantity of

tags sufficient for the counting teams assigned to the areas under the supervisory team's direction. Record tag assignments.

- 7) Prepare and issue list of counting instructions for each
- 8) Discuss counting instructions with each supervisory team.
- 9) Have supervisory teams hold similar meeting with accounting teams which are under their direction

Lucation Quantity Unit of Count Counted By Article Descriptio Unit of Count Counted By

Sample of tag used in single-day inventory method

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11) First counting team counts an area and attaches tag to each pile or bin counted, fills out lower section of tag, tears off stub and hands it in to area supervisory team. Second counting team records its inventory figure on second section of tag, tears off stub and hands it in to area supervisory team. Numbers on tag stubs turned in by second team should match exactly the numbers on the tag stubs turned in by first team.

12) Accountant on supervisory team should check inventory figure on each tag stub turned in by second team against figure on corresponding stub turned in by first team, and reconcile any variations. No erasures shold be made. Any figures not used should merely have a line drawn through them.

Accountant may also classify by a symbol on the "first-count" tag the nature of material counted (raw material, material in process, or finished goods). All adjustments in figures should be made on tag stubs used for first count. These are then routed from the control center to the counting department, where final tabulation is made.

(Condensed from article prepared by Mr. Harrison Young, Management Engineer, Better Packaging Advisory Council, Dept. CP, 12 East 41st Street, New York 17, New York.)

### Chromatographic fractionation aids asphalt weathering studies . . .

separates material into four groups of components, each having different characteristics

To facilitate study of degradation of asphalt by weather, National Bureau of Standards has developed a simple, inexpensive method for separating asphalt into four groups of components. Each group has distinctly different physical characteristics. Analysis of the individual components is expected to yield further information on the part that each component plays in the weathering process.

Procedure consists of dissolving asphalt in n-pentane in order to separate soluble and insoluble materials. After the insolubles — asphaltenes — are removed, the remaining solution is absorbed on fuller's earth in a chromatographic column. The saturated fuller's earth is then washed with a series of solvents (n-pentane, methylene chloride, and methyl ethyl ketone) to separate the individual components.

After the components are separated, they are ready for weathering studies or further chemical analysis. Method is designed primarily for processing not more than five grams of asphalt, the approximate amount used for weather exposure specimens.

(Information courtesy of National Bureau of Standards, US Department of Commerce, Washington 25, D. C.)



SYNTHETIC AMMONIA PLANT of Phillips Chemical Company runs 6 Worthington high-pressure recirculator compressors 24 hours a day.

# Six Worthington compressors handle heavy loads at NH<sub>3</sub> plant

Phillips Chemical Company in Houston, Texas, really gives its Worthington compressors a workout.

Used in the manufacture of synthetic ammonia, the six Worthington high-pressure recirculator compressors are on the job day and night, compressing gaseous nitrogen and hydrogen under severe operating conditions.

Such features as the Worthington's integrally forged cylinder and packing boxes plus one-piece forged pis-

ton and piston rod insure the accurate alignment essential to successful operation of high-pressure equipment.

Worthington builds compressors of every size and type — Y, single and duplex horizontal, balanced-opposed — so you can be sure there's a Worthington to fit your needs exactly. Get in touch with your nearest Worthington district office or write to Worthington Corporation, Water-cooled Compressor Division, Section K.5.4, Buffalo 5, New York.

### WORTHINGTON



Only Worthington Compressors give you Feather Valve Performance

Y-Types • Balanced Angle • Horizontal • Portable • Radial • Gas Engine Compressors

When inquiring check CP 8467 opposite last page





DEPENDABLE POWER for CSC's new topping-plant is furnished by two 3000 KVA automatic-extraction Worthington turbine-generators. They operate on steam at 600 psi, with extraction at 250 psi and exhaust at 40 psi.

## New Worthington turbine-generators help Commercial Solvents double production

In the fall of 1951, the Commercial Solvents Corporation, manufacturers of ammonia, methanol, and other industrial chemicals, undertook the largest expansion program in the company's history — at its Sterlington, Louisiana, plant.

As part of this twenty-million-dollar expansion, a new topping power plant was built to operate with the older 250 psi, 600°F plant. To generate power in this new plant, Commercial Solvents selected two Worthington automatic-extraction turbine-generator sets.

The new additions to the facilities of Commercial

Solvents doubled previous production — making CSC one of the world's largest producers of methanol, with an annual output of 30 million gallons.

Commercial Solvents, like other leading chemical firms who chose Worthington, can look forward to years of dependable service. Worthington turbine generators are built to extremely rugged specifications to assure complete satisfaction.

For more information about Worthington turbinegenerators, get in touch with your nearest Worthington district office. Or write to Worthington Corporation, Steam Turbine Division, Section T.5.9, Wellsville, N.Y.

### WORTHINGTON



STEAM TURBINES

Single- and Multi-Stage Turbines • Turbine-Generators • Deaerators • Boiler Feed Pumps • Surface Condensers

A GREAT TEAM IN STEAM

When inquiring check CP 8468 opposite last page

### Hydrodesulfurization boosts refinery yields . . .

residual oils combined with hydrogen to produce more lower-boiling distillates

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Results obtained after five-year operation of 50 bbl-per-day pilot plant indicate that petroleum refineries may some day realize a 100 per cent yield from crude oil. Using the Gulf HDS (hydrodesulfurization) process the plant has shown that it is economically feasible to combine unwanted residues with hydrogen to produce a greater percentage of gasoline, kerosene, and lighter heating oils than now possible. The moderate-pressure process converts heavy residual fractions and simultaneously lowers sulfur content of the crude charge stock.

Process Description — Process involves use of a catalyst that maintains good activity even after repeated regeneration and in spite of the deposition of considerable amounts of metallic contaminants. In the process, preheated oil-hydrogen mixture enters a special-type downflow, fixed-bed (fluid catalyst modifications have also been investigated) reactor held at 800-850°F and 500-1000 psi. Reaction is exothermic and temperature rise across catalyst bed varies from 10 to 50°F, depending upon charge stock. Space velocities lie between 0.5 and 2.0 evolumes oil per hour per volume catalyst.

Reactor effluent passes through coolers and into a high-pressure flash drum where gas, oil, and water are separated. Flashed gas passes to absorber designed to scrub heavier components from recycle gas. Single-stage recycle compressor circulates hydrogen-rich gas (2500-10,000 std cu ft per bbl of charge) back to preheater. Condensed oil from flash drum passes through a furnace and into fractionating column. A portion of bottoms product from fractionator is returned to absorber while over-head product is pumped to stabilizer.

Results — Typical results show that the 670°F+ bottoms fraction of Kuwait crude is reduced from 49.4 per cent (by volume of the crude) to 20.4 per cent (by volume of the product), with a corresponding increase in distillates. Quality of bottoms fraction is also improved. Overall sulfur content reduction of all fractions ranges from 80 to 85 per cent. Carbon residue of the 670°F+ bottoms is about one per cent, making it possible to charge this fraction directly to catalytic cracking unit.

Economics — It is estimated that a 20,000 bbl-percalendar-day fixed-bed unit for whole West Texas crude oil would require an investment of about \$500 per bbl of daily capacity, direct operating cost of 25 cents per bbl, and a total operating cost (including 10 per cent depreciation and all fixed charges) of 50 cents per bbl. Correspondingly, a 20,000 bbl-per-calendar-day unit to process 71% blend of Kuwait vacuum tower bottoms and

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29% light catalytic cycle oil would require about \$800 per bbl and have a direct operating cost of 75 cents per bbl and a total cost of \$1.10 per bbl.

Costs include complete facilities for manufacturing hydrogen. Costs are considerably lower if by-product hydrogen is available.

(Summary of paper presented at 20th midyear meeting of the American Petroleum Institutes Division of Refining, by Dr. Jerry McAfee, Gulf Research and Development Company, Dept. CP, P. O. Drawer 2038, Pittsburgh 30, Pa.)

### **Presents thermodynamic properties** of methane-nitrogen mixtures

Data required for computing the energy requirements of processes to separate nitrogen from natural gas by liquefaction and distillation are presented in 54-page bulletin. Comparative energy requirements based on attainable compressor and expansion turbine efficiencies, for five cycles with varied operating conditions, are tabulated. Included among illustrations are Mollier charts for nitrogen and methane, and a temperature-entropy chart for methane.

To obtain Research Bulletin No. 21, "Thermodynamic Properties of Methane-Nitrogen Mixtures", remit \$3.50 direct to Information Service, Institute of Gas Technology, Dept. CP, 17 West 34th Street, Technology Center, Chicago 16, Illinois.

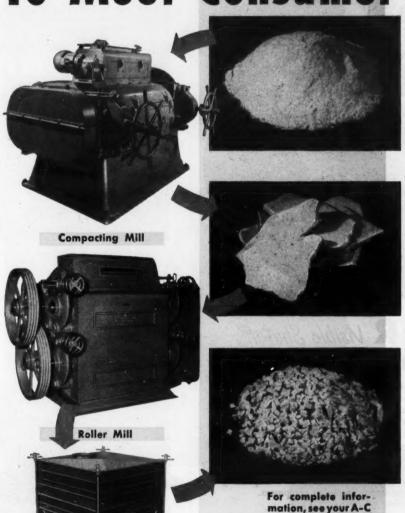


'Yes, sir! We're selecting sales territories right now!"

# ALLIS-CHALMERS PROCESS SYSTEM Converts Fine Particles Into

Circle Sifter

# Granular Product To Meet Consumer Demand



Recovery operation starts with unacceptable minus 30 mesh chemical salt - fines created in original process.

An Allis-Chalmers heavy duty compacting mill is the principal component in the recovery system. The flakes or slabs illustrated are the result of mechanical densification in the compacting mill. An Allis-Chalmers two-pair high corrugated roller mill is used to granulate flakes. Final separation is made in the Circle sifter - an Allis-Chalmers gyratory screen. An 80% to 90% recovery of salable product is effected.

The resulting granules (100% minus 3 mesh and 100% on 10 mesh) equal or surpass natural product in every respect. Reconstituted product differs little from parent product in abrasion tests. Other tests have proved the compacted granule superior in controlled solubility. Granulated product is more uniform in particle size, flows more freely and has better "eye-appeal."

Circle is an Allis-Chalmers trademark.

5-CHALMER

When inquiring check CP 8469 opposite last page

representative or

write Allis-Chal-

mers, Milwaukee 1, Wisconsin, for Bulletin 25C6177J.

# HAMER Visible Shut-off

HAMER PLUG VALVES

**HAMER** 

Will not stick or freeze. Perfect for hard-to-hold fluids. Simple plug adjustment nut eliminates sticking



Hamer Line Blinds are unsurpassed for positive action, easy operation, long-life service and lasting safety. One man can open or blind a line in less than one minute, and there is nothing like a solid plate for a permonent leakproof shut-off. Bar or handwheel operation eliminates wedges, hammers, wrenches needed for spreading conventional flanges. Removes fire hazard of sparking and stops damage to equipment.

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VALVES, INC.

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When inquiring check CP 8470 opposite last page

IDEAS

Prototype glass-reinforced parts quickly produced with matched plastic die method . . .

mold modifications easily made; saves time, money during product development phases

Matched plastic die technique of molding enables manufacturers to produce reinforced fiberglass prototypes without using costly metal dies. Process results in substantial savings of time and money during experimental and development phases of



Pouring resin over fiber-glass in phenolic cavity for tackle-box part in press. Both parts of phenolic die are shown mounted in press

preparing new item for production. Modifications, if needed, can be made at nominal cost and in hours or days, compared with weeks or months required for metal dies.

As many as 70 pieces have been taken off one.



Completed prototype of tackle-box with fittings. Both parts were molded in matched plastic dies



### FEATURE CONTROLLED CHEMICAL COMPOSITION

... so you get better and easier control during processing . . . plus a better, more uniform end product.

### SPECIFY EL DORADO FOR

- PURITY
- SERVICE
- · UNIFORMITY

El Dorado has specialized in coconut oil products for more than half a century. That's one big reason why you can depend on the performance of El Dorado products in your formulations.

### FATTY ACIDS

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For samples and specifications, write Dept. P.

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Bayonne, N. J., Oakland, Calif.

When inquiring check CP 8471 opposite last page

CHEMICAL PROCESSING

matched die with no signs of deterioration in the die. Parts are said to be almost identical to those produced in matched metal dies.

Molding is done under pressures up to 300 psi. Dies work equally well with laminates containing mat or preform, and for parts using premix molding compounds. Process is applicable to polyester reinforced plastic moldings only and cannot be used by high-pressure molders (such as those molding phenolic, urea, melamine, or injectionmolded thermoplastic parts).

Size of molded part is no limitation. It is restricted only by size of press available to hold the metal dies for the finished product. The larger the press, the more valuable the matched die technique, since size is major cost factor of metal dies. Plastic dies used in technique are made from phenolic resins. Epoxy casting resins have also shown promise.

(Matched plastic die technique was developed by Duralastic Products Company, Dept. CP, 2075 West Lafayette Blvd., Detroit, Michigan . . . or for more information about manufacturer's product reader may simply check CP 8472 on handy form opposite last page.)

#### Improved fatty alcohol process requires no esterification, uses copper catalyst

Improved fatty alcohol process, developed in US. produces alcohols by direct hydrogenation of fats or fatty acids. Process uses a copper catalyst and requires no esterification. Yields are said to be almost theoretical. With fatty acids, there is no glycerine lost, and the alcohol obtained is relatively pure. Product is light in color and can be used directly for some applications without further refining.

When using fatty acids as the starting material, the copper catalyst is prepared by using part of the acid feed stock as solvent. Mixture is charged into a stainless steel high-pressure autoclave and heated to the reaction temperature. Hydrogenation is begun, and upon completion, the alcohol is cooled and filtered, ready for shipment or further purification. Catalyst is, to a great extent, recovered.

Following analysis for crude cetyl alcohol is typical of the alcohols produced by the process:

Acid value 0 to 1.3 Saponification value 8 to 14 Congealing point, °C

(Hydrogenation process is available for licensing through H. L. Barnebey, Dept. CP, 835 N. Cassady, Columbus 19, Ohio . . . or for more information about manufacturer's product reader may simply check CP 8473 on handy form which is located opposite last page.)

# FOR INSTRUMENTATION AND CONTROL



Some time ago Revere ran an advertisement featuring Crescent Armored Multitube for use in pneumatic and hydraulic instrumentation and control systems. The advertisement created so much interest that we thought you might like so much interest that we thought you might like to see a photograph of an actual installation. The Control Board Junction Box shown here has 22 runs of Multitube coming into this box comprising 224 Revere Copper Tubes of 1/4" O.D. The picture was taken in the Glenwood Landing, N.Y. Power Station of the Long Island Lighting Company. The tubes go to instruments that report information on temperature, main and reheat steam pressure, fuel oil and gas pressure, liquid levels, tide level and for the control of fuel feed, draft dampers, boiler drum water level and various control valves. water level and various control valves.

This is a relatively new use for Revere Copper Tube, but it is an important one in these days when new ways are being found to obtain process information more quickly and accurately, or to achieve automatic control. Crescent Armored Multitube is made by Crescent Insulated Wire & Cable Co., Inc., Trenton 5, N.J., in lengths up to 1,000 feet. It consists of a group of long tubes twisted together in cable form, protected by a flexible interlocked galvanized steel armor, or by plastic, or both. As many as 19 tubes, 1/4" O.D., can be cabled, with one tube in each layer colorcoded. Larger tubes can also be cabled, including 5/16", 3/8" and 1/2". This construction affords protection during shipment, installation and use, and speeds up installation greatly. For further information, write Crescent, and for tube in copper and aluminum, see the nearest Revere Sales Office.

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801 230 Park Avenue, New York 17, N. Y.

Mills: Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Rome, N. Y. Sales Offices in Principal Cities, Distributors Everywhere.

Control Junction Box at Power Station of Long Island Lighting Company, showing use of Crescent Armored Multitube. Note that relatively sharp bends can be made without damage to the cabled copper tube.

Construction of Crescent Armored Multitube.

When inquiring check CP 8474 opposite last page

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Process industries will welcome the new DENSITROL—the precision instrument that gives a continuous reading of density in flowing liquids such as sugar syrups, brine, acids. DENSITROL electrical indicators or recorders can be located remote from the sampling chamber itself. If desired, DENSITROL can be linked with control mechanisms for automatic regulation. For information on temperature and pressure ranges, calibrations, and other specifics, request Bulletin W-3.

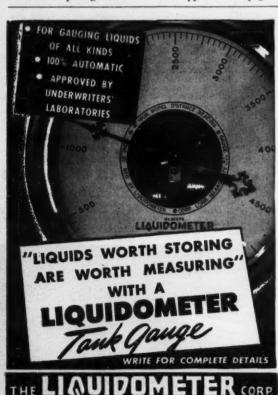
#### PRECISION

THERMOMETER & INSTRUMENT CO.

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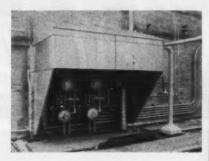
Makers of precision-built thermometers, barometers, hydrometers, gauges, indicators, mercury in glass thermo-regulators,

When inquiring check CP 8475 opposite last page



When inquiring check CP 8476 opposite last page

### instrumentation & control



Analyzers for CO and CO<sub>2</sub> are located near process equipment. Signals are transmitted . . .

... to this control room where recorders and alarms keep constant track of hydrogen contamination



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By-product hydrogen used to make ammonia at Cyanamid's Fortier plant contains CO and CO<sub>2</sub>. These impurities could quickly poison ammonia catalyst, but...

### infrared spots catalyst poison

Finds 5 ppm of oxygen-bearing gases in record time

Problem: If oxygen-bearing compounds reach catalyst used to unite nitrogen and hydrogen, poisoning results. Even a few parts per million of oxygen lowers catalyst efficiency. Protracted contact with oxygen compounds ruins catalyst . . . making a costly shutdown necessary.

In some ammonia plants this might not be a major hurdle. But at Cyanamid's Fortier plant hydrogen is a by-product of acetylene. It does contain CO and CO<sub>2</sub>.

Solution: Obviously, scrubbers can be used to remove carbon dioxide from incoming hydrogen stream. Monoethanolamine and caustic soda are used. A continuous check, however, must be kept on efficiency of CO<sub>2</sub> removal in scrubbers. In round figures, CO<sub>2</sub> level is held in the 5 ppm range.

Analytical procedures have to be extremely sensitive and accurate for meaningful results.

Based on pilot plant experience, Chemical Construction Corporation installed two electro-conductivity trains in a control laboratory. These are sufficiently accurate and provide a continuous recording of CO<sub>2</sub> concentration. Record made by these instruments, however, tends to "smooth out" short duration concentration changes. There is also a time lag.

Since carbon dioxide level fluctuated rapidly and widely, Chemico went to continuous infrared analysis for primary process control. Process analyzer is a descendant of laboratory infrared spectrometers. In place of scanning entire infrared spectrum, unit "watches" narrow band characteristic of compound to be indicated. Construction of the instrument takes rough plant conditions into account — it is far different from delicate laboratory equipment in this respect.

Optical system of the instrument is self-balancing and makes a null measurement. (The name Tri-Non

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refers to a non-dispersing 3-beam instrument. This construction allws operation at continuous true radiation null.) Position of an optical wedge in radiation beam is a measure of concentration of a component of interest. Mechanical system which positions this wedge can be tied in with pneumatic control.

Two of these analyzers were installed at the Fortier ammonia plant. One measures traces of carbon dioxide, the other traces of carbon monoxide. Both were installed as close as possible to sampling points. This helps reduce time lag in sampling. Associated recorders for these analyzers are mounted on central control panel. They are calibrated for 0 to 50 ppm full-scale deflection.

Carbon dioxide analyzer can take its sample from hydrogen stream after caustic soda scrubber or from a point just before stream enters reactor. Automatic sampling arrangement can be used to have it check each stream in turn.

Carbon monoxide analyzer samples gas at output of caustic scrubber. It is located close to a cold box.

While this is a new plant, experience has already shown that infrared analyzers provide much faster indication of stream fluctuations than methods previously used. Whenever CO or CO, concentrations have reached critical levels, quick visual and audible alarms have warned operators in time to take corrective steps. No damage has been done to the catalyst.

Experience at Fortier has also shown that despite high sensitivity and fast response, these instruments require less attention than other analytical methods. Sensitivity has paid off, too, by allowing plant to operate much closer to safety limits permitting an increased throughput.

(Tri-Non Infrared Analyzers are products of the Perkin-Elmer Corp., Dept. CP, Norwalk, Conn. . . . or check CP 8477 opposite last page.)



Need instrumentation for that process?

You'll find just what you need in the alphabetized, itemized Product Directory on pages 210 to 212. All subjects and products presented in ads and editorial columns are there.

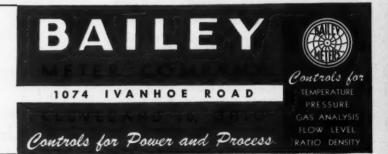


your existing transmitters.

Ask for Product Specification E12-5.

#### ONLY BAILEY OFFERS ALL THESE ADVANTAGES IN A SINGLE RECORDER

- · Pre-calibrated plug-in receiver units
- · Up to four pneumatic or electronic receivers or two receivers and two integrators
- Any four variables on one chart—easily read and interpreted
- A full year's ink supply at one loading
- Faster ordering—from stock
- · Minimum inventory of parts
- Minimum instrument investment for process cycle expansion or alteration



When inquiring check CP 8478 opposite last page

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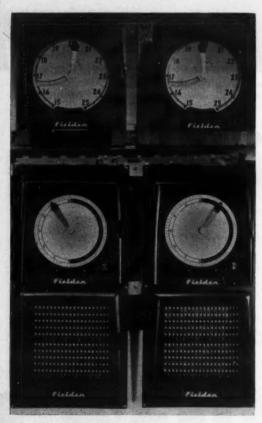
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#### Monitors, indicates trouble on six or more points throughout plant

rings alarm or flashes signals when process strays beyond preset control limits

Monitors and indicates process variables Uses: as level, temperature, pressure; also mechanical movements, thickness, tolerances, weight,

Instrument keeps steady check on six, 12, 24, 48 and more steps in manufacturing processes and actuates alarm or signal when process strays beyond preset control zone.



Two identical 76-point scanning instruments. Top unit indicates process reading. Middle unit tells pointlocation

Description: Instrument has two indicators, one showing temperature being checked, for example, and another indicating location. If process variable deviates from prescribed setting, instrument stops and shows both location and actual reading. Scanner is restarted by pressing reset control. Speed of scanning depends upon number

### FIRST instrument system BASIC GRAPHIC-PANEL

#### It's BRISTOL'S new metagraphic instrument system

A WIDE SELECTION: For example, there are 35 receiver and 34 controller models and the widest variety of transmitters on the market. A model can be found among these that will exactly meet any requirement.

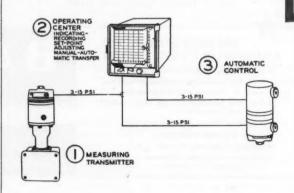
FULL PLUG-IN SERVICE: Change recorder to an indicator or vice versa in 10 seconds with absolutely no interruption what-SOEVER TO AUTOMATIC CONTROL.

Pull complete chassis out (one piece chassis - no tools required). With chassis removed you get the same automatic control as before.

Change from one model to another or if trouble is suspected in a plug-in unit, the doubtful unit can be replaced by a spare while the suspected unit is checked in the service shop — out-of-service time is thus eliminated.

#### CONTINUOUS VALVE POSITION INDICA-

TION on same instrument scale as set point scale, gives continuous data on control valve position—makes "bumpless" transfer possible, simply by matching pointer positions - no need to read actual scale values — minimizes reading errors — speeds operations.





SUPPLIED IN A VERY WIDE VARIETY OF SPANS AND RANGES: For example, absolute pressure instruments are made in ranges as low as 5mm mercury absolute. Pressure instruments as low as 5 inches water to 10,000 psi. Over-range protection available up to 400% over range.

STANDARD BRISTOL MEASURING ELEMENTS ARE USED - high torque, wide-angle travel gives powerful, positive operation. Very sensitive - as little change as 0.03% of range, including reversal.

#### METAGRAPHIC INSTRUMENTS MEASURE, RECORD, INDICATE, AND AUTOMATICALLY CONTROL

Pressure

Liquid Level

Vacuum

Flow

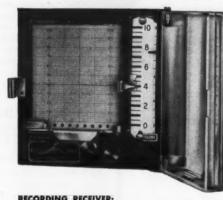
**Absolute Pressure** 

Temperature and

**Differential Pressure** 

**Mechanical Motion** 

### that carries out idea completely!



Also furnished as an Indicator

NO INTERRUPTION WHATEVER TO AUTOMATIC CONTROL when receiver chassis is removed. The chassis of a Metagraphic Receiver is plug-in construction and can be changed from a recorder to an indicator or back in a matter of 10 seconds.

OFFERED FOR UP TO 3 MEASURED VARIABLES - with air pressure regulators or air-loaded regulators — three-position manual-automatic transfer valves for automatic control and six-position (on the same knob) transfer valves for cascaded control.

ALL MEASUREMENTS ON SAME SCALE PLATE: Deviation of pointers shows at a glance conditions of control - no need to read scale.



VARIETY AND FLEXIBILITY: The most flexible and complete line of controllers offered - 34 different models, including the following variations:

- 1. Remote set-point 2. Integral set-point (with or without air-loading)
- 4. Plug-in receiver
- 3. Pipe-connected
- 5. Plug-in pipe or surface
- 6. Five models of control action as follows: a. On-Off
- b. Adjustable proportional
- c. Adjustable proportional plus reset
- d. Fixed proportional plus reset
- e. Proportional plus reset plus rate (derivative)

Write for our product data sheets. The Bristol Company, 141 Bristol Road, Waterbury 20, Conn.

## BRISTOL

BRISTOL'S POINTS THE WAY IN

**HUMAN-ENGINEERED INSTRUMENTATION** 

AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS

When inquiring check CP 8479 opposite last page

of points checked and is limited to maximum rate of one point per second.

Instrument can be adapted to actuate automatic control systems for correction of trouble without necessity of signalling operator.

(Indicating scanner is product of Fielden Instrument Division, Robershaw-Fulton Controls Company, Dept. CP, 2920 N. Fourth St., Philadelphia 33, Pa. . . . or for more information about manufacturer's product reader may simply check CP 8480 on handy form which is located opposite last page.)

Here's unit for instrument shop - check response, eliminate erratic thermostats . . .

> low heat inertia chamber allows rapid cycle testing

For testing thermostats rapidly in plant Uses: instrument shop and eliminating erratic units.

Instrument has low heat inertia test chamber to allow test temperature to reach equilibrium rapidly. Thermostats can be cycle-tested.

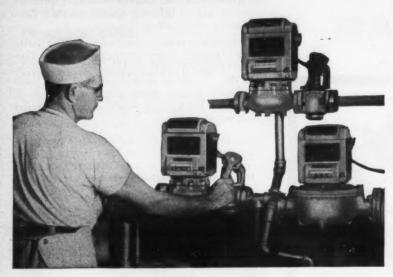


Tests thermostats rapidly with low heat inertia test

Description: Test temperature can be controlled either manually or automatically by thermostat under test. Response of thermostat may be observed by indicator light on front panel. Unit operates on 115v AC and requires 440 watts. Instrument is housed in metal cabinet 121/2 x 21 x 15" and weighs 55 lb.

(Model TT-1 thermostat test unit is product of Statham Development Corporation, Dept. CP, 12411 W. Olympic Boulevard, Los Angeles 64, Calif. . . . or for more information check CP 8481 on handy form which is located opposite last

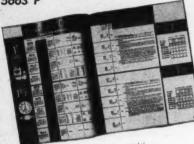
# Three Neptune Meters Boost Production 200%



Less than half a minute of a man's time is required to measure three ingredients . . . corn syrup, liquid sugar, and water . . . into each batch of Nalley's table syrup. The operator simply pushes buttons on the Neptune Auto-Stop meters to set the pounds required by the formula, and opens the valves. The Auto-Stops shut off automatically . . . accurately . . . leaving the operator free to devote full attention to other details.

One man now produces more than three times as much as formerly was produced by five men handling bulk sugar and barreled corn syrup.

Ask for helpful Meter Selection Book 566S P



This Auto-Stop batching meter is only one of many models and sizes of Neptune meters . . . ranging from meters with simple counters to electric switch adaptations and remote control systems . . . now handling more than 150 different industrial liquids. Sizes from 25 to 1000 gpm. Bronze construction. Telephone or write nearest branch for full details.

### NEPTUNE METER COMPANY 50 West 50th Street, New York 20, N. Y.

Branches in:

ATLANTA • BOSTON • CHICAGO • DALLAS • DENVER NO. KANSAS CITY, MO. • LOS ANGELES • LOUISVILLE PORTLAND, ORE. • SAN FRANCISCO

In Canada: NEPTUNE METERS LTD., TORONTO 14, ONTARIO



When inquiring check CP 8482 opposite last page

#### INSTRUMENTATION

#### lilustrates melting-crayons accurate to $\pm$ 1 %

Containing concise directions for use, six-page two-color booklet shows crayons, pellets and coatings which melt sharply at predetermined temperatures. Melt points are accurate to  $\pm 1\%$ . Suggested applications include temperature indication in plastic molding, heat-treating, engine and furnace checking. Products are available for temperatures from 113 to 2500°F.

Bulletin on "Tempilstiks" is available on letterhead request from Tempil Corporation, Dept. CP, 132 W. 22nd St., New York 11, N.Y.

### Check 144 thermocouples or resistance bulbs, use 1 switch box . . .

switch assemblies can be used with millivoltmeter or potentiometer pyrometers

Uses: Central-switch control of pyrometric equipment with large number of thermocouples or resistance bulbs.

Features: Switch assemblies can be used with millivoltmeter or potentiometer pyrometers, resistance thermometers.

**Description:** Switches are key-style(telephone), double-pole, three-position. Cross-bar contacts are

palladium; contact springs are tempered nickel silver. Contacts can be arranged to handle many circuit transfer actions. Switch models include DPDT and 4PDT, locking and nonlocking. Internal wiring from switches to screw terminals is copper on standard models. Conductors of thermocouple material are available. Resistance bulb



Assembly is enclosed in cabinet

switches have internal copper conductors for threewire resistance bulb cable.

Switch cabinets are two sizes. Small size is  $10 \times 12 \times 9''$  with capacity for 48 thermocouples or 36 resistance bulbs. Large size is  $167/_8 \times 183/_8 \times 111/_4''$  with capacity for 144 thermocouples or resistance bulbs.

(Selector switches are product of Thermo Electric Co., Inc., Dept. CP, Saddle River Township, Rochelle Park Post Office, N.J. . . . or for more information check CP 8483 opposite last page.)

# TEMPERATURE measurement and control



#### GORDON XAC LINE

with

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tac

AUC

Controls temperature automatically within a fraction of

a degree in any heat process. A complete factory-assembled unit ready for installation anywhere. Can be used with any existing indicating or recording pyrometer controller

-regardless of age.

### XAC EMP

A quality-built, convenient instrument for quick, accurate temperature reading in molten nonferrous metals. Also, other models of Xactemp for all-around temperature checking.



Thermocouple Wire
Thermocouple Extension Wire

Insulated in Gordon's own plant to assure consistent quality. All standard wire and insulations carried in stock for quick delivery. Other wires, in long or short runs, manufactured to specifications.

**Full Particulars on Request** 



#### CLAUD S. GORDON CO.

Manufacturers • Engineers • Distributors
Temperature Control Instruments • Thermocouples &
Accessories • Industrial Furnaces & Ovens • Metallurgical Testing Machines

603 West 30th Street, Chicago 16, Illinois 2031 Hamilton Avenue, Cleveland 14, Ohio

When inquiring check CP 8484 opposite last page

CHEMICAL PROCESSING

Read current to 300 amperes, voltage to 600 volts with pocket meter . . .

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AC clamp volt-ammeter has one scale for all ranges and shock-mounted meter movement

Uses: Plant electrical maintenance of AC equipment using voltages to 600 volts and current to 300 amperes.

Features: Clamp volt-ammeter is lightweight, pocket-sized with single scale for all ranges. It uses shock-mounted instrument movement which is self-shielded.

Description: Thumb switch selects voltage or current range on one scale. Clamping jaws are neoprene-covered, tapered for measurement in



AC volt-ammeter uses only one scale for all ranges

limited areas, are opened and closed by spring trigger. They have ground faces for positive contact. Jaws accommodate conductors up to 1" round or  $1\frac{3}{4}$  x  $\frac{3}{8}$ " rectangular. Scale window is plexiglass. Instrument reads six current ranges: 300/150/60/300/15/6 amperes, three voltage ranges: 600/300/150 volts. Instrument case has compartment for voltage test leads.

(AC clamp volt-ammeter is product of Weston Electrical Instrument Corporation, Dept. CP, 614 Frelinghuysen Ave., Newark 5, N.J. . . . or for more information about manufacturer's product reader may simply check CP 8485 on handy form opposite last page.)

# Red hot problem

ANOTHER UNUSUAL FLOW MEAS-UREMENT PROBLEM SOLVED BY TAYLOR INGENUITY I

The picture shows an 8" all-welded stainless steel calibrated orifice section 24 ft. long, to be used as a primary standard. It's red hot because it measures the flow of molten sodium which is used as a heat transfer medium in an atomic energy project.

What's unusual about this? First, construction of such a large section is uncommon indeed, and immediate delivery was imperative lest it hold up an important project. Second, the calculation, design and fabrication of the primary element required highly specialized knowledge and skill. Third, certification of calibration by an independent laboratory revealed accuracy well within the specified limits.

What's not unusual about it? The customer brought his urgent and exacting problem to Taylor Instrument Companies for solution.

A repeat order soon after delivery is a tribute to the ingenious application engineers on the Taylor payroll. Their speed and resourcefulness in solving this out-of-the-ordinary flow measurement problem typifies the desire of everyone at Taylor to handle unusual jobs unusually well.

Probably your instrumentation problem has nothing to do with molten sodium measurement, but it's equally probable we'd have a good answer. Why not call your Taylor Field Engineer today? Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada.



Taylor
Instruments
MEAN ACCURACY FIRST

INDICATING, RECORDING, CONTROLLING

TEMPERATURE, PRESSURE, FLOW, LIQUID LEVEL,

SPEED, DENSITY, LOAD AND HUMIDITY

#### Indicates absolute pressure on two low-pressure ranges from 0.1 to 20 mm Hg

Uses: Low-pressure measurements in laboratory or plant, in single or multiple measuring-point systems.

Features: Reads absolute pressure directly on two ranges, 0.1 to 20 mm mercury and 0.5 to 5 mm mercury on expanded scale.

Description: Maximum sensitivity of instrument is in low-pressure range. Thermocouples are noble metal and are housed in nickel-plated gage tubes to reduce outgassing, system contamination and corrosion. Gage tube has quick response and is not damaged by release to atmospheric or posi-



Dials control switching between two ranges

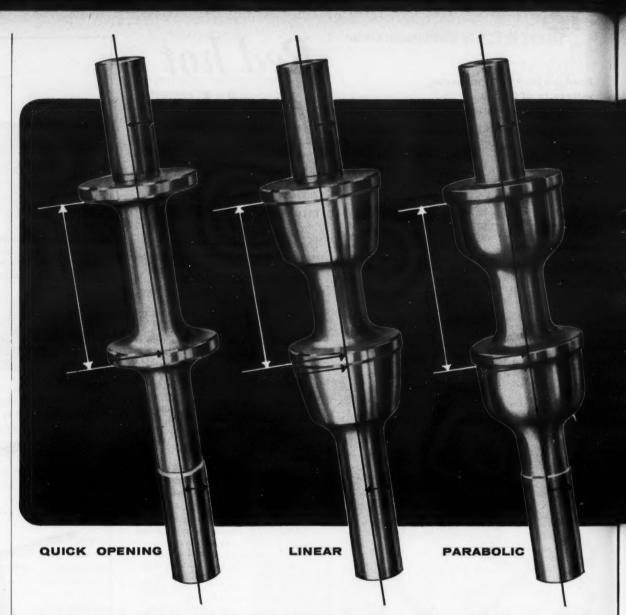
tive pressures. Instrument can be used with switching unit to monitor multiple-point system. Standard strip-chart, millivolt recorder operating on 10 mv or less is suitable for recording pressure data from instrument. Continuous readings can be made without affecting pressure. Instrument is suitable for remote installation and can be calibrated for cable length from gage tube to indicator. Gage tube is 1½" long by ¾" OD with ½" IPS male thread coupling. Instrument operates on 115v AC.

(Hastings absolute-pressure indicator is product of Hastings Instrument Company, Inc., Dept. CP, Hampton, Virginia . . . or for more information check CP 8487 on handy form opposite last page.)

#### Basic circuit arrangements given for timers

Including eight basic circuit arrangements for timers, six-page bulletin suggests applications. Circuit designs include sustained-start, momentary-start, and repeat-cycle operation. Circuits are for variable time intervals or sequences.

Bul N-140 is issued by Automatic Temperature Control Co., Inc., Dept. CP, 5212 Pulaski Ave., Philadelphia 44, Pa. When inquiring specify CP 8488 on handy form opposite last page.



#### INTERCHANGEABLE PARTS

# An Important Factor in Uniform Quality of Masoneilan Control Valves

You have a right to expect to be able to install replacement parts without recourse to a machine shop for custom fitting. When you use Masoneilan Control Valves you get parts that fit. For Mason-Neilan precision methods, automatic machines and specially designed

tools and gages, plus rigorous inspection, eliminate the maintenance man's headaches and reduce costly time out of service.

By maintaining this precise uniformity, Mason-Neilan makes certain that every valve will be in perfect alignment and that any par

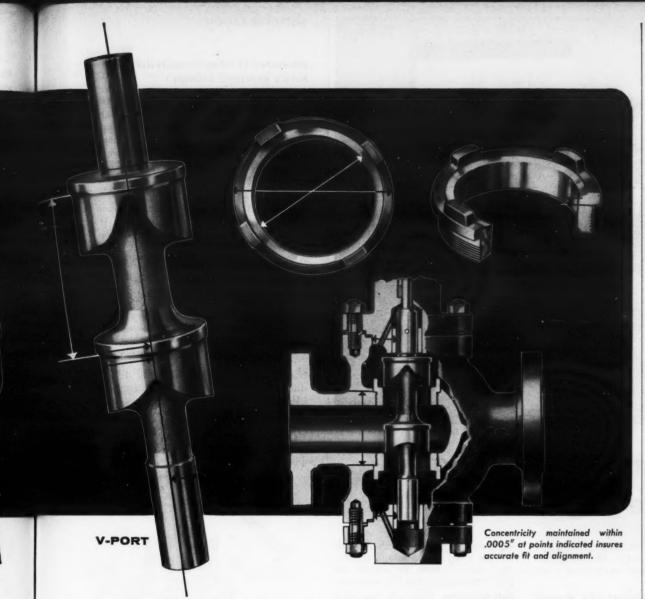
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parts you may install later will also be in perfect alignment.

Moreover, because valve plugs of comparable size but different flow characteristics are interchangeable, conversion is a comparatively simple operation.

These quality features,

added to other outstanding qualities of Masoneilan Control Valves, offer you low *cost* at comparable *price* — and over-all cost not price is the valid comparison.

Investigate the practical advantages of

Masoneilan Control Valves.

Write for complete data.

#### MASON-NEILAN REGULATOR CO.

1203 ADAMS STREET, BOSTON 24, MASS., U. S. A.

Sales Offices or Distributors in the Following Cities: New York • Syracuse • Chicago • St. Louis • Tulsa Philadelphia • Houston • Pittsburgh • Atlanta • Cleveland • Cincinnati • Detroit • San Francisco Boise • Louisville • Salt Lake City • El Paso • Albuquerque • Odessa • Charlotte • Los Angeles Corpus Christi • Denver • Appleton • Birmingham • New Orleans • Dallas • Seattle Mason-Neilan Regulator Co., Ltd., Montreal and Toronto

When inquiring check CP 8489 opposite last page

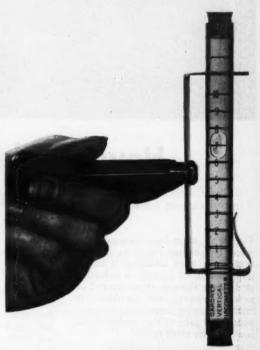
#### Has viscosity range measurement from 7 to 5000 Stokes units with accuracy of 2% . . .

viscosity of fluid is related to time required for bubble to travel length of tube

Uses: Determining viscosity of transparent oils, polymers, resins, varnishes, dopes, other solutions directly in plant without waiting for lab check.

Features: Size of tube and distance of bubble travel have been so chosen that time of full bubble travel in seconds is equal to viscosity in Stokes units.

**Description:** Unit consists of a precision-bore Pyrex-brand glass tube approximately 155 mm long, and tube holder with a plastic handle. Procedure for measuring viscosity requires filling tube



Bubble travel time in seconds is Stokes viscosity

to leave space for bubble of proper size, bringing sample to correct temperature, measuring time bubble requires to pass from zero to ten. Extremely viscous materials can be measured over one of ten equal divisions. Conversion table supplied with unit allows readings to be converted directly to poises if specific gravity is known.

(Viscometer is product of Gardner Laboratory, Inc., Dept. CP, 4723 Elm St., Bethesda 14, Md. . . . or for more information about manufacturer's product reader may simply check CP 8490 on convenient handy form which is located opposite last page.)

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### How to Select an Economical Temperature Regulator

First of all, what does economy mean where temperature regulators are concerned? In some industries it means improvement of product or reduction of spoilage through closer control of process temperatures. In others, it means the paring down of operating expense. The price of the regulator itself is a relatively small factor.

Today's buyers are shopping for:

- Accuracy of control not only when the regulator is new, but throughout its service life
- Dependability to prevent loss of production time
- 3. Minimum installation and maintenance cost

Here are a few tips on what to look for when you're installing a new or replacing an old temperature regulator —

Packless construction . . . and for this reason: A diaphragm operated, packless regulator minimizes friction. There are no closely fitted parts to stick or bind

because of uneven expansion or collection of foreign matter. Also, there's less maintenance, since no repacking is ever required.

A guarantee against wire drawing of the seats and discs. Insist on it. This guarantee in combination with single seat design assures you of tight shutoff; you avoid expensive steam losses as well as loss of product in a process application.

Broad control range. In a standard regulator you should expect a control range of 100 F. And make sure the unit you select has a vapor tension thermostat that can take over-temperatures of at least 100 F.

Easy maintenance. Why ask for grief? Your temperature regulator should be basically simple in design so that it can be serviced by average plant personnel. All parts should be readily accessible for testing and cleaning.

Double duty. There's no point in buy-

ing a separate pressure regulator when you can select a temperature regulator that combines both temperature and pressure control within the same unit.

**Self-operating.** Make sure you get a regulator that operates on its own initial pressure. By doing so, you avoid the purchasing and maintenance of an air compressor plus air piping, and you're sure of uninterrupted operation during electric power failures.

All of these points are important to you when it comes to selecting an economical temperature regulator. Perhaps you didn't realize you could expect so much. And perhaps you didn't realize that Spence Temperature Regulators offer all these features and more. May we send you our Bulletin T 500 containing further details?

SPENCE ENGINEERING COMPANY, INC.

Walden, New York

INSTRUMENTATION

#### Interested in infrared analysis? here's quarterly bulletin

Quarterly bulletin devoted to gas analysis and DC amplifiers is being issued by manufacturer. First issue features use of gas analyzers in pilot plant operation. Each issue of booklet will contain bibliography of recently-published literature in fields of gas analysis and DC amplifiers. When space permits, a brief abstract of each article will be included.

"The L-B Analyzer" is issued by Liston-Becker Instrument Co., Inc., Dept. CP, 649 Hope St., Springdale, Conn. When inquiring specify CP 8492 on handy form opposite last page.

#### Uses rare earth in capsule as radiation source . . .

portable X-ray unit has thulium-170 as radiation source with 129-day half-life

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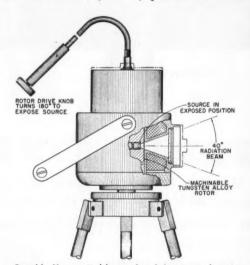
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Uses: For commercial research, developmental studies and experimental field applications of radiation.

Features: Unit is small, portable (weighs 20 lb) and inexpensive.

Description: Source of X-rays is 200 mg of radioactive thulium (Tm-170) pressed into alumi-



Portable X-ray unit (shown above) has tapered port for radiation beam

num capsule. Capsule is recessed into small cylinder of tungsten alloy which rotates within outer shield of lead-filled cast brass. Unit is about six inches in diameter, seven inches long. Radiation is emitted through tapered port. When indicator knob is turned to "off", radiation is effectively shielded in all directions.

When inquiring check CP 8491 opposite last page

Thulium-170 has half-life of 125 to 129 days, radiation-energy gamma-rays 0.84 mev. Cobalt-60 has half-life of 5.2 years, radiation-energy gamma-rays

(Fact sheet on portable thulium X-ray unit and information on loan of units is available from Technical Services Division, Chicago Operations Office, U.S. Atomic Energy Commission, P.O. Box 59, Lemont, Illinois.)

Measures volume, cuts off pump or signals an operator, is explosion-proof . . .

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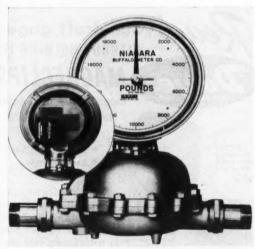
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meter-controller is electrically controlled to reduce friction load on meter works

For controlled pumping in hazardous or explosive atmospheres; used with water and waterbase liquids, oils, solvents, corrosive chemicals.

Unit is electrically controlled to reduce friction load on meter works. Register is explosion-proof.

Description: Instrument consists of standard meter plus a register containing an electric switch. Electrical circuit is completed after passage of



Insert shows switch on back of register. Meter is standard model

predetermined quantity of liquid. Liquid flow is controlled by a solenoid valve. Access plate on rear of register permits adjustment of switch closing points. Microswitch used in register carries Underwriters' Laboratories listing of Class 1, Groups C and D, Class 2, Groups E, F and G.

(Electricontact meter is product of Buffalo Meter Co., Dept. CP, 2892 Main St., Buffalo 14, N. Y. Check CP 8493 opposite last page.)

### Send for your copy

NEW BULLETIN



for complete information on a new flow-control approach in paper making processes

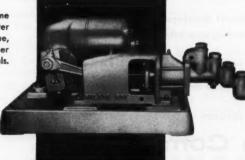
> SEE HOW leading mills improve product quality and reduce chemical costs through efficient metering of paper makers chemicals in:

- Stock preparation
- · Bleaching
- Water treating
- Conversion

This first-of-its-kind Bulletin describes and illustrates over thirty applications for Controlled Volume Pumps that you can profitably use in your mill.

Send for your free copy today . . . on your company letterhead, please.

Typical Controlled Volume Pump . . . used to meter dye, size, defoamer, glue, alum, slimicide, and other paper makers chemicals.



Milton Roy Company, Manufacturing Engineers, 1300 East Mermaid Lane, Philadelphia 18, Pa.



Engineering representatives in the United States, Canada, Mexico, Europe, Asia, South America, and Africa.

When inquiring check CP 8494 opposite last page

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### Wheelco Instrument Service



#### benefits in measurement and control!

Your Wheelco field engineer can serve you . . . and save for you . . . in ways that go far beyond delivery of the product. A factory-trained instrument specialist, he can help you specify and design control systems closely tailored to the job. He can assist you with installation and service problems, survey your supply requirements, and stock instruments, parts, and thermocouples needed on short notice. With a complete line of the world's finest instruments and accessories to choose from, you can buy with confidence from your Wheelco representative.



### Newest instrument development for furnaces, ovens, and kilns

Wheelco's 400 Series Capacitrols bring you two totally new control forms for reducing cost and increasing accuracy of heating operations. Write for details in Bulletin F-6314-1.

WHEELCO INSTRUMENTS DIVISION

### Barber-Colman Company

Dept T, 1520 Rock Street, Rockford, Illinois

BARBER-COLMAN OF CANADA, LTD., DEPT. T, TORONTO, ONTARIO, CANADA Industrial Instruments Automatic Controls Air Distribution Products Aircraft Controls Small Motors Overdoors and Operators Molded Products Metal Cutting Tools Machine Tools Textile Machinery

When inquiring check CP 8495 opposite last page

INSTRUMENTATION

Checks refractive index of process stream continuously . . .

has sensitivity of 1.2 x 10<sup>-5</sup> R.I. units per division

Uses: Continuously monitors refractive index of liquid process stream. Instrument allows automatic control of liquid-stream blending.

Features: Refractometer has sensitivity of 1.2 x 10<sup>-5</sup> refractive index units per division. Temperature and pressure variations are compensated automatically by maintaining standard and sample at same conditions.

Description: Refractometer measures difference in refractive index between sealed-in liquid sample and flow sample drawn directly from process line. Measurement is



Refractometer continuously monitors refractive index

based on bending effect caused by passing ray of light from one medium to another of different refractive index. Beam deflection is proportional to refractive index difference and is measured by optical servo system. Telemetering circuit for recording or direct control is provided.

(Refractometer is product of Consolidated Engineering Corporation, Dept. CP, 300 N. Sierra Madre Villa, Pasadena, Calif. Check CP 8496 opposite last page.)



#### \*COSTS CUT 60¢ per hour per machine

"...simplified our time study and cost analysis."

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- "... and, we will install your units on all our machines."
- "... meets all our requirements. Ship 35 more units at once."

— just a few of the many comments we receive daily about...

#### TIME RECORDER-TOTALIZER



This precision instrument provides accurate, permanent, chronological data about any machine, process or system in plant or office ... on a continuous chart-roll which lasts four months. Uses no ink. Totalizer shows accumulated "on" time.

Descriptive literature CP on request.

RECORDER DIVISION
HEAT-TIMER corporation
657 BROADWAY, NEW YORK 12, N.Y.

When inquiring check CP 8497 opposite last page

# Read your draft gage ...WITHOUT HOLDING IT! MAGNECLIPS magnetically hold gages

to any steel surface

- mount instantly
- grip securely (15 lbs.)
- free both hands
- protect gage



One Magneclip holds U-Tube Manometer to duct for positive easy velocity reading (with Dwyer Pitot Tube).



Two Magneclips level and hold Inclined Manometer to a hard to reach overhead duct. One man does a former "two-man" job. Dwyer Magneclips—magnetic mounting clips—slip on all 1-inch thick portable inclined gages. Clips simply slide on . . . spring action keeps them in place. Drilled on one side and complete with self-tapping screw for the 1211 series Slack Tube, No. 1210, 1215 and 1230 Flex-Tube Manometers. Per Pair . . . \$2.50

Order trial set today or write for Bulletin No. B-18

F. W. DWYER MFG. CO. P. O. BOX 373-K, MICHIGAN CITY, IND.

When inquiring check CP 8498 opposite last page

CHEMICAL PROCESSING

Recording spectrophotometer has extended range -200m # to 3 #

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For differential recording and analysis by spectrophotometer.

Instrument features extended range of 200 mu to 3 u plus linear recording of transmittance or absorbance.

Description: Recording spectrophotometer is based on manufacturer's DU quartz monochromator. Instrument uses double-beam optical sys-



Data are recorded on file-size pre-printed chart paper

tem with a single photodetector and ratio recording. Wide selection of recording speeds permits rapid scanning. Built-in recorder presents data on file-size preprinted chart paper.

(DK-2 spectrophotometer is product of Beckman Division, Beckman Instruments, Inc., Dept. CP, Fullerton, Calif. Check CP 8499 opposite last page.)



Guess you were right about that resistor being 22K and not 22 ohms!"



SHORT WELDED NOBLE METAL ELEMENTS

withstand the vibration and shocks that ruin long wired gauge tubes. Elements are direct heated, reach operating temperature in less than one second.



### New Hastings Vacuum Gauge Lasts 10 Times Longer

Short, direct heated elements can't be damaged by vibration or pressure changes

Here is a vacuum gauge that provides laboratory-type accuracy under industrial production conditions. Simple to operate. Dependable. Highly stable. Single knob control.

Standard instrument case model, complete with gauge tube.

#### ONLY \$100.00

Available with switching attachment and matched gauge tubes for master station indication of up to 29 points. Calibration accuracy independent of lead length or ambient temperature.

For further information wire HICO Instrument Division, Hastings Instrument Company, Hampton 10,

#### ALL HASTINGS VACUUM GAUGES

provide highest accuracy through the 1-1000 micron range. Direct reading logarithmic scale expands lower range indications. Panel mounted and instrument case models available with matched gauge tubes, switching attachment, strip chart recorder.



#### HASTINGS VACUUM CONTROLLER

automatically maintains vacuum systems in any desired range from 1-1000 microns with highest accuracy. Operates pump, alarm system, valves, etc. Response time 1/2 second. Internal voltage regulation.



#### HASTINGS INSTRUMENT

COMPANY, INC.

Main Office and Laboratories • HAMPTON 10, VIRGINIA

When inquiring check CP 8500 opposite last page

#### Television camera uses normal or room light and gets picture . . .

compact unit is complete television system

Uses: For televising industrial operations either too dangerous or remote for convenient checking, inspecting, recording. Instrument can also be used for instructional purposes, televising an actual operation to employe group.

Features: Instrument is complete television system. Signal from camera can be fed directly to antenna of any standard commercial television receiver or to any picture monitor.

Description: Camera requires minimum light of only 15 foot candles and gives pictures under normal room-lighting conditions.

Unit is compact and self-contained; no intermediate equipment is required between camera and receiver. Camera functions can be remote-controlled, including optical-focusing, lens-changing, panning and tilting. Signal output is strong enough to feed a number of television receivers or monitors. Spectral response is approximately the same as the human eye. Size of unit is  $10 \times 6^{3}/4 \times 4^{3}/4^{\prime\prime}$ . Weight is  $8^{1}/4$  lb.

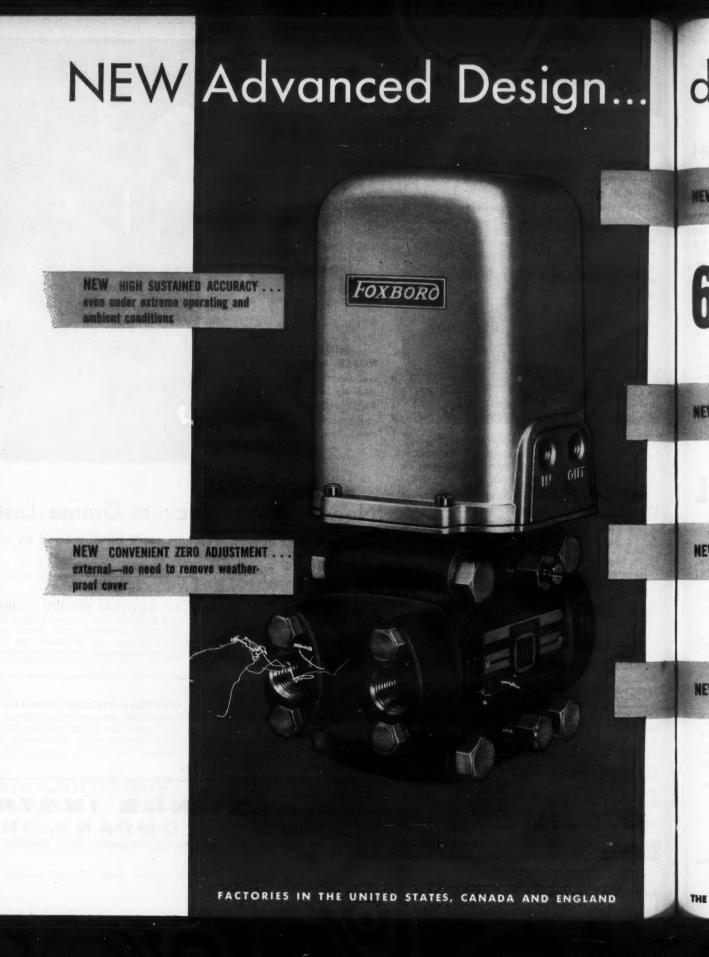
(Type 5359-B Teleye is product of Allen B. Du Mont Laboratories, Inc., Dept. CP, 1500 Main Ave., Clifton, N.J. Check CP 8501 opposite last page.)

### Sounds alarm automatically when process variable reaches limit . . .

controls any variable measurable by differential transformer

Uses: Automatic alarm systems for process control involving pressure, weight, stress, motion, or other quantities measured by differential transformers.

Features: Instrument feeds regulated excitation voltage to



# d/p Cell Flow Transmitter...

**NEW POSITIVE OVERRANGE PROTECTION . . . up to full 1500 lbs. cell rating** 

# 6 Major Achievements!

NEW FULLY ADJUSTABLE RANGE . . . from 0-50" to 0-250" H<sub>a</sub>O differential

NEW AUTOMATIC INTERNAL DAMPING . . . fast, stable measurement

**NEW SIMPLICITY . . . lowest cost installation** 

Pioneered by Foxboro 7 years ago, the d/p Cell\* Transmitter established a new standard of performance in flow measurement and control. Over 40,000 are maintaining that standard in every branch of industry today. Technical advances, based on this unequalled experience, now have added even further reliability, economy and convenience. Call your Foxboro representative for a demonstration. Write for new Bulletin 13-11.

\*Reg. U. S. Pat. Off.



est in flow measurement

transducer and has 4½" contactmaking meter with adjustable limit contact.

Description: Instrument has SPDT output relay for operation of external alarm or controls. Relay is energized whenever measured quantity equals or exceeds preset limit and opens when



Relay is energized when indicating pointer reaches limit pointer

quantity falls below limit. Pilot light indicates relay position. Relay contacts are rated at 5 amp, 250v AC. Maximum full-scale sensitivity is zero to 0.025 inch using typical differential transformer. Another model features two contacts with high-low regulation.

(Model 331 displacement controller is a product of the Daytronic Corp., Dept. CP, 216 S. Main St., Dayton 2, Ohio . . . or for more information check CP 8502 on handy form which is located opposite last page.)

For handy data on glycols, see nomograph on page 202 of this issue.



For more information on product at left, specify CP 8503 . . . see information request blank opposite last page.



FOR ACCURATE
REMOTE
MEASUREMENT
of Flow,

of Flow, Liquid Level, Pressure



#### **NEW! SIMPLEX ORTHOFLOW**

Now you can transmit data accurately over great distances for instant reference at central or control points.

TRANSMITTER—Compact new electric unit actuates both in-plant and remote meters... unaffected by normal variations in voltage, temperature. Simple, dependable, rugged. Accuracy of ±2%

at any point over wide flow ranges.

RECEIVER—Time-proven Simplex H Meter. Precisely duplicates transmitted data . . . automatically resets to correct data after power interruptions. Indicates, records, totalizes. Easy-to-read flow scale and chart.



Simplex Valve & Meter Company
Dept. CP-8 7 E. Orange St.,
Lancaster, Pa.

When inquiring check CP 8504 opposite last page

# FOR SIMPLIFIED GAS ANALYSIS CONTROL

If the gas component you want to measure or control is related to the specific gravity of the gas, a RANAREX will measure it accurately, continuously, without lag and at low cost.

Works on a simple, mechanical principle . . . rugged, foolproof. Can be equipped for automatic control. Analyzes flue gas to cut fuel costs . . . aids quality control in heat-treating, chemical processing, oil refining . . . checks uniformity of fuel gas, etc.

For details, write to The Permutit Company, Dept. CP-8, 330 West 42nd St., New York 36, N. Y.



RANAREX

When inquiring check CP 8505 opposite last page

#### INSTRUMENTATION

#### Transmits infrared radiation at 2 to 12.5 $\mu$ . . .

arsenic trisulfide glass can be soldered for high-vacuum seal

Uses: Instrument glass for bolometers, pyrometers, gas analyzers, spectrometers, monochrometers, temperature control and infrared detection systems.

Features: Glass may be vacuumsealed. Epoxy resins will handle moderate vacuum-seal requirements. Special soldering methods will give high-vacuum-seal.

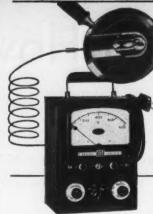
Description: Arsenic trisulfide glass does not react with dilute hydrochloric, nitric, sulfuric acids. It may be washed in ordinary tap water, and dried with lens tissue, ready for use. Glass can be coated to increase transmission to over 90 per cent for wave lengths between 1 and 8 microns. Glass is non-toxic if used below its melting point. Special shapes and sizes - either lenses, corrector plates, prisms, films, wedges or window - can be fabricated on order to meet special needs.

(Servofrax is a product of Servo Corp. of America, Dept. CP, 2020 Jericho Turnpike, New Hyde Park, New York . . . or for more information check CP 8506 on handy form opposite last page.)

#### Engineering data on thermocouples

Including engineering data on selecting thermocouples and pyrometer accessories, two-color bulletin suggests specific thermocouples for installations in chemical, ceramic, petroleum applications. Bulletin has 56 pages and includes 165 photographs and line drawings. Installation techniques are suggested. Thermocouple calibration data are included.

Bul P1238 is issued by the Bristol Company, Dept. CP, 127 Bristol Road, Waterbury 20, Conn. When inquiring specify CP 8507 on handy form which is located opposite last page.



Only Fenwal's

NEW

Precision
Instrument
Offers This 3-in-1
Temperature
Control

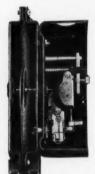
Fenwal's new Series 560 Temperature Indicating Control uses the hermetically glass-sealed, steel en-

closed thermistor element. It offers sturdy, simplified operation and extra sensitivity in a wide variety of industrial and labor tory applications. It is the only instrument that has such a 3 way ontrol... on-off, proportional, adjustable differential at the fitp of a switch. It is assured accurate to within 4 of 1% of full scale, using inexpensive standard wiring up to 200 ft. The thermistor's great resistance change allows use of simple null balance bridge circuit for sure stability in temperatures from 200°F to 600°F, with resulting lower initial cost and minimized maintenance. Send for detailed Series 560 data now to Fenwel incorporated, 248 Pleasant Street, Ashland, Mass.



Controls Temperature ... Precisely

When inquiring check CP 8508 opposite last page



CROSS SECTION

### DIFFERENTIAL PRESSURE

FOR AIR OR GAS (INCHES OR HUN-DREDTHS OF INCHES OF WATER)

Incorporates two pressure chambers separated by a diaphragm. Opens or closes an electrical circuit according to a minute change in the difference between two pressures or vacuums.

Suggested application: Indicate a change in resistance through a filter due to a clogging of the filter—indicate a change in differential across an orifice due to a change in flow conditions—indicate an unbalanced condition of two air ducts.

Operating ranges: 6.0" vac. to 6.0" press., and 30.0" vac. to 30.0" press.

AVAILABLE IN FOUR MODELS

To open or close an electrical circuit upon an increase or decrease in the difference between two gas or air pressures.

To successively open or close two electrical circuits upon an increase or decrease in difference between two air or gas pressures.

To close one circuit on an increase of the difference between two pressures and close one circuit on a decrease of the difference between two pressures. To open one circuit on an increase of the difference between two pressures and open one circuit on a decrease of the difference between two pressures.

FOR ALL TYPES OF SERVICE For General Purpose Nema 1, Weatherproof Nema 1A, 2, 3, 4; Explosion-proof (Hazardous Locations) Class 1 Group D, Class 2, Group E, F and G. Equipped with the famous Mercoid magnetic sealed mercury contact.

WRITE FOR BULLETIN CA-3P

THE MERCOID CORPORATION
4201 BELMONT AVE., CHICAGO 41, ILLINOIS

When inquiring check CP 8509 opposite last page

Selective controller prevents problems of freeze-up, over-heating

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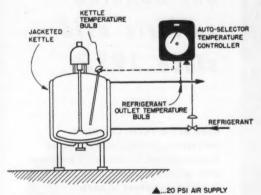
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Cold polymerization of rubber and plastics is usually exothermic but not uncontrollable. Reaction is normally controlled by cooling batch kettles with refrigerant. Refrigerant flow has been controlled by a single-action kettle-bulb thermostat.



Selective controller is one-instrument solution to two control problems

Selective controller has been developed for mildly exothermic reactions as cold polymerization of rubber and plastics. Unit is a one-instrument solution to two problems of freeze-up and over-heating.

When refrigerant outlet temperature, influenced by load changes, tends to drop below level which might result in freezing, controller automatically throttles refrigerant intake valve to raise temperature. Controller again acts as kettle temperature approaches maximum. Valve is operated to prevent kettle from over-heating.

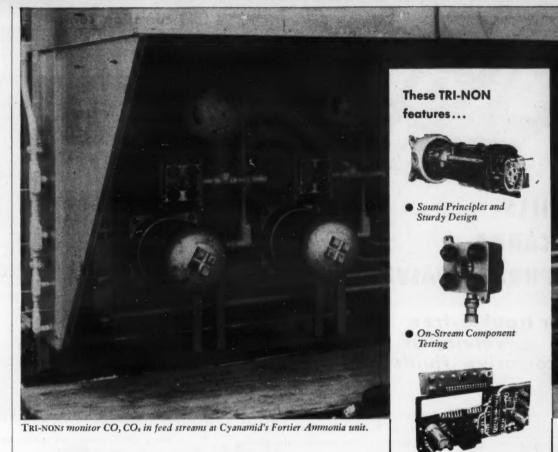
Instrument also controls refrigerant flow while kettle is charging, impossible with single-action control based solely on kettle bulb. Instrument will provide control without total immersion of kettle bulb.

(Controller is product of The Foxboro Company, Dept. CP, 174 Neponset Ave., Foxboro, Mass. . . . or check CP 8510 opposite last page.)

> THAT'S INTERESTING

Tube ID measures only 0.002"

Take a hair from your head (if you can spare it) . . multiply the diameter three times, and you have the outside diameter (0.006") of a piece of Nichrome V tubing that was drawn down from a 1/2" OD welded tube by Superior Tube Co. of Norristown, Pa. The hole in this tube measures only 0.002" . . . but it's there! (D-H Alloy Craftsman, Driver-Harris Co., Harrison, N.J.)



TRI-NON\* Analyzers lengthen time between turnarounds...

reduce operating costs

In addition to providing important analytical control on process streams, continuous infrared analyzers can be a highly important factor in preventive maintenance. Where product mix conditions in a process stream may lead to fouling, catalyst poisoning, afterburning, etc., analyzers will give immediate warning of such conditions in time to take corrective steps.

FOR EXAMPLE, the two TRI-NON Analyzers at American Cyanamid Company's new Fortier plant protect the catalyst in the ammonia reactor from poisoning by oxygen compounds, thus reducing risk of costly shut-downs. In another unit, TRI-NON Analyzers are used to monitor the feed composition going to the acetylene burners so as to maintain smooth operation and desired acetylene concentrations in the burner exit gas.

Rapid Interchange of

...add up to depend-

and easy maintenance

ability plus quick

Components

Many refineries have installed analyzers in the off-gas of "cat" crackers to follow CO concentrations, since an increase in this gas is an accurate, early indication of the development of an afterburning condition.

Perkin-Elmer TRI-NON Analyzers are available in a wide range of models and prices to meet all types of continuous analytical problems. They are rugged and dependable, expressly designed for use in the varied environments of the processing plant or refinery. And they are backed by Perkin-Elmer's experienced engineers who are ready to provide expert guidance in their application and installation.

THE PERKIN-ELMER CORPORATION



FIRST IN ANALYTICAL CONTROL

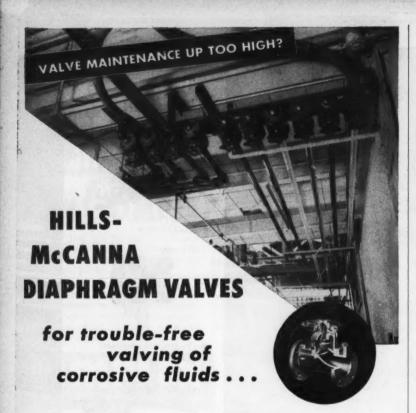
NORWALK, CONNECTICUT . Offices in New Orleans . Chicago

\* TM The Perkin-Elmer Corporation

Silver Spring, Maryland

Zurich, Switzerland

When inquiring check CP 8511 opposite last page



Ten valves ceiling mounted, controlling the flow of thousands of gallons of valuable fluids daily, could be a real maintenance problem, but the valves shown in the photo don't present this problem . . . and here's why:

Repairs are rare ... normally only occasional diaphragm replacement is necessary with the Hills-McCanna diaphragm valve. Even that is easy — the entire bonnet assembly is removed with four nuts, leaving the body in line. Since all working parts are isolated from the flow, no fluid ever gets to the bonnet ... making packing and packing worries unnecessary.

Hills-McCanna Diaphragm Valves are available in a choice of body materials of any machinable alloy, or with linings of lead, glass, rubber, plastic, etc. Fifteen diaphragm materials including rubber, Teflon and synthetics are available and a choice of lever, handwheel or remote operators make Hills-McCanna headquarters for valving hundreds of corrosive fluids. Add your valve needs to the list if they are in the range of %" through 14", pressures to 150 psi and temperature to 350° F. Write HILLS-McCANNA CO., 2370 Nelson St., Chicago 18, Ill., for details.

### "MILLS-MCCANNA

saunders patent diaphragm valves

Also Manufacturers of:
PROPORTIONING PUMPS
FORCE FEED LUBRICATORS • MAGNESIUM ALLOY SAND CASTINGS

When inquiring check CP 8512 opposite last page

#### corrosion control



Filling sulfuric indoors and outside, hose stays flexible and . . .

. . resists abrasive action of concrete loading dock



# Hypalon hose has handled sulfuric acid since 1952

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Used at Northern Chemical Industries, inner construction of hose is based on DuPont's polymer and specially-compounded cover is highly resistant to both chemicals and abrasion

F IRST used in 1952, Hypalon acid hose is giving excellent service conveying sulfuric acid in concentrations of 58 to 66° Baume (75 to 93% H<sub>2</sub>SO<sub>4</sub>), in a wide range of temperatures at 35 psi. Hose is "on the job" at Northern Chemical Industries, Inc., Searsport, Maine. Company is well satisfied with the excellent service life and lower maintenance costs rendered by this hose.

Northern Chemical ships sulfuric acid in carboys, and by tank-truck and tank-car. Filling operations called for a flexible, abrasionand chemical- resistant hose. N.C.I. was not satisfied prior to December 1952, because service life of hose in use was so short.

After rigorously testing many acid-resisting hoses, N.C.I. found one, which utilizes Du-Pont's Hypalon polymer in its basic construction, to be best. The carcass of this hose is strong and flexible, with multiple plies of high-tensile duck assuring high burst-resistance. Hose cover is of pure gum rubber, which is resistant to strong concentrations of chemical solutions and to the abrasion resulting from hose being dragged from place to place during filling operations.

(Maltese Cross Hypalon acid hose is a product of Hewitt-Robins Incorporated, Dept. CP, Stamford, Conn. . . . or for more information check CP 8513 on handy form opposite last page.)

### Rupture discs resist HCI in ethyl chloride plant

Problem: At the National Petro-Chemicals plant at Tuscola, Ill., one of the products is ethyl chloride. In that area of the plant where this material is produced, metal (non-ferrous) rupture discs with fluorocarbon polymer lining were in use on the HCl stripper. The HCl was getting through the lining and eating the metal, causing disc to fail.

Solution: A rupture disc of impervious graphite was installed. This disc is machined from one solid piece of resin-impregnated graphite.



Non-metallic rupture disc is machined from single piece of resinimpregnated graphite

The material is relatively lightweight, non-contaminating, unaffected by thermal shock, and possesses excellent thermal conductivity. Below are some of the physical properties of the impervious graphite used in disc.

Density (Ib/ft²)	109		
Porosity (%)	none		
Tensile (psi)	2600		
Compression (psi)	8900		
Transverse (psi)	4650		
Modulus of Elasticity (10°)	23		
Thermal Expansion (in/°F/in)	2.54 x 10 <sup>-6</sup>		

These rupture discs will fit all standard ASA 150# flanges and are intended for use between vessel nozzle and vent line. They are furnished from stock in nominal nozzle sizes from 2 to 12", and are available on special order up to 30" diameter for almost any burst pressure.

**Results:** Impervious graphite discs have been in use about one year and have not failed due to corrosion as did former discs. Breakout due to excess pressure has occurred very close to predetermined burst pressures.

(Impervite rupture discs are a product of Falls Industries, Inc., Dept. CP, Aurora Road, Solon, Ohio . . . or for more information about manufacturer's product reader may simply check CP 8514 opposite last page.)



# Protect this motor from 3600-rpm expressed to she dirt and corrosion

3600-rpm explosion-proof motor with fan housing removed to show unidirectional fan.

Cooling air is carried through the heat expel practically all kinds of dirt. If oily or sticky dirt should cling, tubes can be ramrodded clean on the spot in a few minutes because tubes are straight and tube ends are exposed. Also, the tubes are distributed uniformly around the perimeter of the stator yoke and along its full length — cooling all parts of the motor evenly.

#### Choice of Corrosion-resistant Materials

You can lick corrosion with this motor, too. Tubes are available in a variety of materials to meet practically any corrosive atmospheric condition. Allis-Chalmers tube-type motors have long and successful experience in such difficult

applications as caustic plants, refineries and petrochemical plants, power plants with fly ash problems and many others.

#### **Get Complete Information**

Next time you need a motor for a dirty or corrosive location or for outdoor operation in all kinds of weather, call your Allis-Chalmers District Office. Get complete information on Allis-Chalmers tube-type totally-enclosed, fan-cooled and explosion-proof motors. Or write Allis-Chalmers, Milwaukee 1, Wisconsin, for Bulletin 51B7149. Available in ratings on frames larger than NEMA 505 up to 3000 hp.

### **ALLIS-CHALMERS**

When inquiring check CP 8515 opposite last page

NG

### You can solve your tough corrosion problems by using **Bitumastic** Coatings



rosive combination. But the steel is not attacked because it's protected by Bitumastic® No. 50—a heavy-duty coating specially formulated to control the severest corrosive forces.

Tough corrosion problems can be solved, but not by using ordinary paints or conventional protective coatings. For long-term protection, it takes specialized protective coatings . . . the Bitumastic Coatings Koppers makes.

Bitumastic Protective Coatings are specially formulated from a tar-pitch base\* that is, for all practical purposes, impervious to moisture. These coatings keep moisture away from exposed metal surfaces . . . and that's the best way to stop corrosion.

With tough, durable Bitumastic Protective Coatings, a thickness up to eight times that of ordinary paints can be obtained in one application. Where other factors are equal, the thicker the coating the longer the period of protection.

Send for a set of free booklets describing the family of Bitumastic Protective Coatings. At the same time, tell us about your corrosion problems so that we can suggest a satisfactory solution. There is no obligation, of course.

\*Hi-Heat Gray is a non-coal-tar vehicle and metallic pigment.



#### KOPPERS COMPANY, INC.

Tar Products Division, Dept. 879-T, Pittsburgh 19, Pennsylvania DISTRICT OFFICES: BOSTON, CHICAGO, LOS ANGELES, NEW YORK, PITTSBURGH, AND WOODWARD, ALA.



When inquiring check CP 8516 opposite last page

#### CORROSION

#### Polyvinyl chloride tape specifically formulated for pipe protection

Wrapping above-ground and buried pipes wherever corrosion is a problem.

Features: An improved version of company's Scotchrap pipe insulation, PVC tape is formulated exclusively for pipeline corrosion prevention. It can be satisfactorily applied in temperatures as low as



Improved PVC tape adheres better

zero degrees F. In addition, tape has an improved adhesive that sticks better at all temperatures.

Description: Two pressuresensitive PVC tapes are available: No. 50 which is 10 mils thick for use in wrapping fittings and wherever maximum conformability is necessary; and No. 51, 20 mils thick for straight-run wrapping.

(Scotchrap pipe insulation is a product of Dept. E-584, Minnesota Mining and Manufacturing Company, Dept. CP, 900 Fauquier Street, St. Paul 6, Minn. . . . or for more information check CP 8517 on handy form opposite last page.)

#### **Controlling corrosion** in water systems

How corrosion, scale, slime, and algae can be effectively controlled in water systems is described in four-page bulletin.

Bul on water control is available from Wright Chemical Corp., Dept. CP, 627 W. Lake St., Chicago 6, Ill. When inquiring specify CP 8518 opp. last page.



Efficient - h = 260 BTU/hr./ft.2/Deg. F.

#### Cools corrosive fluids with complete protection

#### PYREX brand alass shell and tube heat exchanger

Here's a new way to safely cool, condense, partially condense, exchange or reflux corrosive fluids and fluids sensitive to metallic contamination.

It's the Pyrex brand glass shell and tube heat exchanger. In this unique new unit, fluids contact only glass, chemically resistant ceramic and Teflon. It brings you relief from fouling, corrosion and contamination. You can use either the shell side or tube side for all fluids except HF or hot concentrated phosphoric acids and alkalis.

You can choose from two capacities: 131/2 and 50 sq. ft. Both are compact. The 50 sq. ft. unit, for example, requires only 9" x 13'6" floor space, 13" height and weighs just 165 lbs.

For complete details that show how the PYREX brand glass shell and tube heat exchanger can simplify your corrosive fluids processing, circle the reader service form at the back of this publication.



#### CORNING GLASS WORKS

Corning, New York

Corning means research in Glass

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When inquiring check CP 8519 opposite last page



strength, lowest cost.

Special fasteners of all types, in any metal are a HASSALL specialty. Small as well as large quantities economically produced. The use of special cold forged parts may cut your parts cost and reduce your assembly cost.

We have a variety of raw material in stock. Our delivery is fast. If you have a fastening problem, tell us about it ... we may have the answer.

JOHN HASSALL, INC. P.O. Box 2196
Westbury, Long Island, New York

When inquiring check CP 8520 opposite last page

CHEMICAL PROCESSING

#### Technetium shows promise as corrosion inhibitor

G. H. CARTLEDGE, Chemistry Div. Oak Ridge National Laboratory Oak Ridge, Tennessee

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Technical paper, "The Pertechnetate Ion As An Inhibitor of the Corrosion of Iron and Steel," tells of the discovery that the first element to be synthesized by man is effective in preventing corrosion. Besides providing one more weapon against corrosion, discovery furnishes a further insight into the mechanism of inhibition.

Technetium, atomic number 43, derives its name from the fact that it was the first of the previously unknown elements to be artificially prepared. This achievement was accomplished in 1937 when infinitesmal amounts were obtained by bombarding a molybdenum target with neutrons or deutrons. Since then much larger amounts have been produced by separation from the fission products of nuclear reactors.

Experiments conducted over a two-year period show that the pertechnetate ion, TcO<sub>4</sub>—, inhibits the corrosion of iron and carbon steels in aerated water at temperatures from 23 to 250°C, which was the highest temperature investigated. It was found that even at 250°C, 5 ppm of technetium in distilled aerated water effectively inhibits attack on SAE 1010 steel. Inhibition depends upon the maintenance of some minimum concentration of dissolved pertechnetate, amount being dependent on nature of metal and its surface activity.

(Technical paper was presented at the 1955 Annual Conference of the National Association of Corrosion Engineers in Chicago.)

#### Catalogs stainless pipe fittings

Standard pipe fittings and flanges, flanged and butt-weld fittings are cataloged in 24-page brochure punched for notebook insertion.

Cat 653 is issued by Camco Products, Inc., Dept. CP, 445 State St., North Haven, Conn. When inquiring check CP 8521 on the convenient Reader Service slip opposite last page.

#### For better ways to whip corrosion . . .

. . . try the handy Product Directory (starting this issue on page 210). You'll find it an easy "page-locator" for ideas, materials, and services.

#### Another new development using

### B. F. Goodrich Chemical raw materials



B. F. Goodrich Chemical Company does not make these panels. We supply only the raw materials.

## Rigid vinyl windows beat double trouble

WHAT do you do when windows are attacked from two sides? By corrosive fumes and hot air inside, and outside by the weather. A chemical plant in Texas had the problem and found the answer. In went new translucent panels made from Geon rigid vinyl—out went the old windows and a costly maintenance problem!

Installing the green-tinted corrugated panels was easy—they were simply nailed in place. Because they are made from Geon, they resist sunlight, cold, rain, acids, alkalis,

oil and grease. They are decorative as well as functional.

Products made from Geon rigid vinyl include corrosion-proof pipe, fume ducts, tanks, trays, materials that can be machined, planed, sawed, drilled, and cemented. You'll find other Geon polyvinyl materials in flexible, colorful upholstery, in high-dielectric insulation, in wear-resistant flooring, in hundreds of other successful products.

Geon's remarkable physical and chemical properties may give your products a decisive competitive edge. For technical information, please write Dept. BD-4, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.



GEON RESINS • GOOD-RITE PLASTICIZERS... the ideal team to make products easier, better and more saleable.

GEON polyvinyl materials • HYCAR American rubber and latex • GOOD-RITE chemicals and plasticizers • HARMON colors

When inquiring check CP 8522 opposite last page

NG

Tight bond to metal given by baked-on, vinyl-base protective coating . . .

special primer which dries in 20 min is used

Uses: As coating for wire baskets, transformers, armature coils, cables, electroplating racks.

Features: Coatings are applied over a one-coat primer which tightly bonds plastisols to metal surfaces such as steel, copper, brass, aluminum, or galvanized iron. Primer may be applied by brushing, dipping, roller-coating or spraying. After application liquid plastisol coating is converted to tough, resilient film by simple application of heat, approximately 350°F being required for fusion.

Description: Application of plastisol coating may be by dip or spray depending on size or shape of object to be coated and amount of coverage desired. A soft, decorative coating or a hard, tough finish of substantial thickness can be produced.

(Denflex plastisol metal coatings are products of Dennis Chemical Company, Dept. CP, 2701 Papin St., St. Louis 3, Mo. . . . or for more information check CP 8523 on handy form opposite last page.)

Rough treatment, temps to 350°F withstood by bubble cap and riser assemblies . . .

handle all solvents and alkalis, most acids

Pictured below are bubble cap and riser assemblies precision cast of glass-reinforced furfural ketone resin with carbon loading. Plastic bubble caps are resistant to all solvents, all alkalis, and most acids.

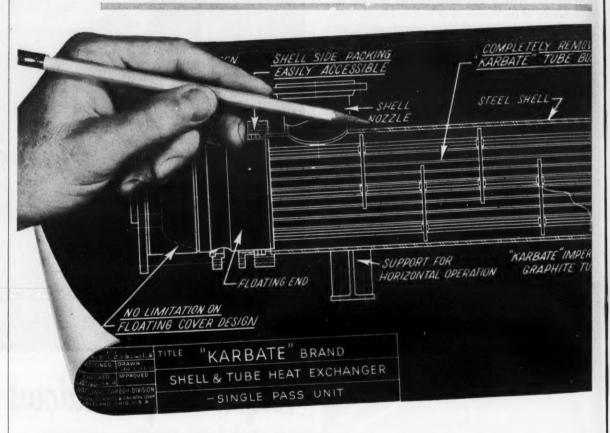


These caps will withstand rough treatment and temperatures to 350°F. For easy cleaning, the assembly can be secured to a tray with Teflon snap rings or neoprene O-rings. Design allows full gas flow with a minimum of resistance. Trays can be operated with a liquid level from 1 to 1½".

(Camac Furacam bubble cap and riser assemblies are products of Carl Buck & Associates, Dept. CP, P. O. Box 267, Essex Fells, N. J. . . . or for more information check CP 8524 on handy form opp. last page.)

ANNOUNCING... NATIONAL CARBON'S COMPLETE LINE OF

# "KARBATE" IMPERVIOUS (



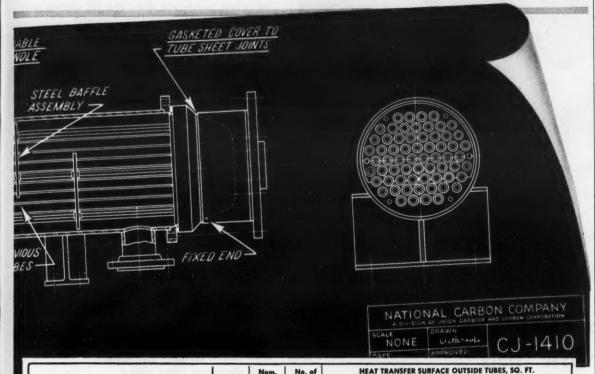
### HERE'S WHAT YOU GET WITH "KARBATE" STANDARD HEAT EXCHANGERS:

- LOWER FIRST COST... through quantity production
- MORE AREA PER UNIT... to 2300 square feet per tube bundle
- . CHOICE OF TUBE LENGTHS . . . 6, 9, 12, 14, 16 feet
- FASTER DELIVERY... from extensive factory stocks
- ...and all the advantages of "Karbate" Impervious Graphite, including:
- . COMPLETE CORROSION RESISTANCE
- . HIGH THERMAL CONDUCTIVITY
- . IMMUNITY TO THERMAL SHOCK

Engineered for maximum corrosion resistance and minimum maintenance, these shell and tube heat exchangers are so constructed that all surfaces in contact with the corrosive fluid are of "Karbate" brand impervious graphite. Their mechanical design, proved in years of service, utilizes the material's high compressive strength to assure ruggedness beyond the toughest operating requirements.

Always consider "Karbate" brand impervious graphite. Take full advantage of this versatile material by including "Karbate" heat exchange equipment in every estimate where corrosion-resistance is a factor. And when you do this, you'll be pleasantly surprised at the cost comparison with heat exchangers of materials having far less effective resistance to corrosion.

# GRAPHITE HEAT EXCHANGERS



NOW . . . buy "Karbate" brand shell and tube heat exchangers any size, any type, any design directly from National Carbon, pioneer and leader in the field of corrosive heat transfer.

Components of all sizes of "Karbate" Brand Heat Exchangers are manufactured in quantity and carried in stock. You save money...you save time...when you specify "Karbate" Brand Shell and Tube units.

Series	tanning.	140.01					
	Size Shell	7/8" I.D. Tubes	6' Long Tubes	9' Long Tubes	12' Long Tubes	14' Long Tubes	16' Long Tubes
90	6"	9	17.7	26.5	-	-	-
310	10"	31	_	91.2	121.6	141.9	162.2
420	14"	42	81.7	123.3	164.8	192	220
640	16"	64	124.3	187.7	251	293	335
850	18"	85	165.2	250	334	389	444
1090	20"	109	213	320	427	499	570
1350	22"	135	263	397	530	618	706
1630	24"	163	317	479	640	746	852
1950	26"	195	379	573	766	892	1017
2330	28"	233	453	684	914	1166	1217
2680	30"	268	521	786	1051	1225	1400
3490	34"	349	679	1024	1368	1595	1822
4390	38"	439	855	1289	1722	2009	2295

"KARBATE" BRAND IMPERVIOUS GRAPHITE IS MANUFACTURED EXCLUSIVELY BY NATIONAL CARBON COMPANY

Remember, whenever you are buying corrosion resistant heat exchangers, that it will pay you to get our proposal on "Karbate" brand Heat Exchangers!

> The term "Karbate" is a registered trade-mark of Union Carbide and Carbon Corporation

#### **NATIONAL CARBON COMPANY**

A Division of Union Carbide and Carbon Corporation 30 East 42nd Street, New York 17, N. Y.

Sales Offices: Atlanta, Chicago, Dallas, Kansas City, Los Angeles, New York, Pittsburgh, San Francisco IN CANADA: Union Carbide Canada Limited, Toronto



WRITE FOR NEW CATALOG SECTION S-6800

When inquiring check CP 8525 opposite last page

#### Cuts down corrosive effects of rust, moisture, fumes

Corrosion from rust, moisture, and chemical fumes is cut down by neoprene paint which has excellent adhesion to metal, wood, and ceramic surfaces. Applied as a paint, material dries to a continuous oil-resistant rubber film. Paint dries to touch within 30 minutes.

Coating is flexible, does not become brittle, and will resist shock. Paint comes in black, aluminum, and colors.

(APCO Neoprene protective paint is a product of Adhesive Products Corp., Dept. CP, 1660 Boone Ave., New York 60, N.Y.... or for more information check CP 8526 on handy form which is located opposite last page.)

#### Lightweight, resistant fasteners are made of nylon . . .

standard sizes are available from stock

All-nylon fastenings stocked by company include many of the popular sizes of machine screws, with additional items to be added. These fastenings are only one-sixth the weight of stainless steel and one-half the weight of aluminum. Their unusual features include the fact that they will "give and take" against other surfaces, and lock in place to eliminate loosening under vibration.

In addition, fastenings will resist high voltages at commercial frequencies and withstand heat up to 450°F. They are unaffected by commercial solvents, alcohols, gasoline, oils, and boiling 40% caustic soda.

(Nylo-Fast nylon fastenings are products of Anti-Corrosive Metal Products Co., Inc., Dept. CP, 1210 River Road, Castleton-on-Hudson, New York . . . or for more information check CP 8527 on handy form opposite last page.)

#### Water system trouble spots outlined in booklet

Various water system trouble spots and factors that can produce breakage and failure in components of heaters, boilers, condensers, process equipment, and interconnecting piping are outlined in six-page booklet. Caustic and hydrogen embrittlement are discussed. Advice is given on practical steps to be taken to control cracking and other damage to water systems before it occurs.

"Cracking and Embrittlement" is available from Hall Laboratories, Inc., Dept. CP, 323 Fourth Ave., Pittsburgh 30, Pa. When inquiring specify CP 8528 on handy form which is located opposite last page.

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# That's the long-life valve on sulphuric acid

THE CASE HISTORY: At a large midwestern refinery there were recently two valves of different makes on a 90% sulphuric acid line. As seen in the photo above, these valves worked under identical conditions, almost side by side—each operated about three times daily.

Less than a year in the line, the valve at left started leaking, with the leak getting rapidly worse. In contrast, the Crane No. 475½ all-iron gate valve at right, with two years' continuous service to its credit, was still giving completely good performance.

That's Crane quality in valves—with a 100-year background in quality manufacturing. That's why Crane valves are the first choice of thrifty buyers in the petroleum industry as in all others. Crane Co., General Offices, Chicago 5, Ill. Branches and Wholesalers serving all industrial areas.

#### CRANE IRON BODY WEDGE GATE VALVES

Here are valves of unusual strength for their 200-pound W.O.G. rating. Body and bonnet are oval shaped, with exametal where needed most. Their Crane-quality cast iron with highly engineered operating design makes these valves outstanding performers wherever they're used. A complete family to choose from. See your Crane Catalog or your Crane Representative.





CRANE CO.

VALVES . FITTINGS . PIPE

CRANE'S FIRST CENTURY...1855-1955

When inquiring check CP 8529 opposite last page

#### CORROSION CONTROL

#### Crazing and corrosives resisted by clear thermoplastic . . .

material is readily fabricated and won't chip or shatter

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Uses: For all glazing, especially in formed instrument panels and dials, and for applications where plastics are exposed to commonly corrosive chemicals.

Features: Plastic shows excellent resistance to abrasion — five times that of methacrylate. It resists crazing and is immune to most corrosive chemicals. Completely formable and machinable, it also withstands severe weather conditions.

Description: Because it does not chip or shatter, this clear plastic reduces window breakage, increases safety of men and materials, and lowers maintenance costs. It provides an excellent transparency for use as a hood or shield covering dangerous machines and harmful chemical vats.

Clear plastic material is available in sheets 1/6, 3/32, 1/8, 3/16, and 1/4" thick. Standard sheets are made in sizes up to  $40 \times 50$ ".

(Thermoplastic Dura-lite is a product of The Homalite Corporation, Dept. CP, 15 Brookside Drive, Wilmington 166, Delaware . . . or for more information check CP 8530 on handy form opposite last page.)

#### Even rusted surfaces paintable with aluminum paint based on colorless vehicle

Uses: For both indoor and outdoor use on metal surfaces.

Features: Paint is made of doubly-pigmented aluminum mixed with a colorless base vehicle. Employment of latter is said to do away with bleeding problems commonly associated with black asphalt and bituminous-base aluminum paints. Clear liquid base also facilitates better "leafing" of aluminum flakes to form a moisture-proof coating. A brighter finish is obtained and possibility of fading or "darkening" is eliminated.

Description: Aluminum anti-rust paint can be applied with minimum surface preparation, and without wire brushing, scraping, or sandblasting. When painted on rusty metal, material penetrates into the surface and provides a seal against further rust action. Application is by brush, spray, or roller.

(Rust-Cure XX Aluminum anti-rust paint is a product of The Monroe Company, Inc., Dept. CP, 10703 Quebec Ave., Cleveland 6, Ohio . . . or for more information reader may simply check CP 8531 on handy form opposite last page.)

#### Stops need for frequent replacement of instrument tubing . . .

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tube harnesses are copper or aluminum encased in plastic

Uses: Multiple-line instrument tube harness applications.

Features: "Ribbon" of harness consists of ten copper or aluminum tubes, each tube individually encased in its own chemical-resistant plastic sheath, which is attached to adjacent tubes by a perforated plastic web. Construction enables one or more individual tubes, or a group of tubes, to be stripped from the ribbon without tools and without destroying protective coating. Coating of each individual tube is 0.020" thick virgin elastomeric black polyvinyl chloride.

Description: Need for frequent instrument tubing replacement is eliminated since plastic coating is chemical-resistant and completely covers each tube. Harness assures ease and rapidity of installation. It is available in lengths to 500'.



Coating of each individual tube is black PVC

Standard tube OD's are  $\frac{1}{4}$ " with .030 copper or .032" aluminum wall tubes, and  $\frac{3}{8}$ " with .032 copper or .035" aluminum wall tubes. Overall width of "ribbon" is  $\frac{4 \cdot 1}{8}$ " with  $\frac{1}{4}$ " OD tubes; 5. $\frac{1}{8}$ " with  $\frac{3}{8}$ " OD tubes.

(Dekoron "M" Ribbon instrument tube harness is a product of Dekoron Products Division, Samuel Moore & Company, Dept. CP, Mantua, Ohio . . . or check CP 8532 opposite last page.)

#### Ninth edition of paint, varnish, and lacquer standards

A review of over 200 specs, tests, and definitions issued by ASTM on paint, varnish, lacquer, and related products is contained in the 868-page ninth edition, available at \$6.00 per copy from American Society for Testing Materials, Dept. CP, 1916 Race St., Philadelphia 3, Pa.

#### √ Industry wipes out corrosion with Firestone Exon Resins

# Tons of caustic corrosives...BUT... NO COSTLY CORROSION! Put a corrosive alkali with so chemically active a gas as chlorine and you

corrosion in metal equipment! No such worries at Murro Chemical Co., Portsmouth, Va. Their sodium hypochlorite tanks (4' high, 3' in diameter) were designed by Amroc, Inc., New York City. A Vyflex L-10 tank lining 3/32" thick, applied by La Favorite Linings, Inc., Hawthorne, VYFLEX L-10\* LININGS N. J., made all interior surfaces, inlets, outlets, and flange connections MAKE CAUSTIC SODA AND corrosion-proof. Once again-corrosion costs are wiped out by material based on Exon resins. CHLORINE BEHAVE! VYFLEX L-10 derives its immunity to corrosion from its base resin, Exon 900 series. These are only a part of the many Exon resins developed by Firestone engineers to wipe out corrosion costs. In plant after plant, lightweight structural rigid applications of unplasticized PVC are based on equally effective resins in the ever-growing EXON line. The fact is, you can stop corrosion! Exon PVC resins provide a wide variety of materials to develop the answer to your specific problem.

For details to answer your particular need, call or write:

\*Product of Kaykor Industries, Inc.

Division of Kaye-Tex Mfg. Corp., Yardville, New Jersey

#### CHEMICAL SALES DIVISION

Vyflex L-10 is made from Exon resins

Firestone

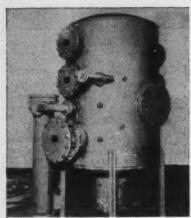
FIRESTONE PLASTICS COMPANY, DEPT. 8S POTTSTOWN, PA.
A DIVISION OF THE FIRESTONE TIRE & RUBBER COMPANY

When inquiring check CP 8533 opposite last page

NG

get not only an extremely powerful

industrial bleach, but considerable



This solvent recovery unit-reboiler, condensing and cooling elements-was fabricated of nickel-clad steel.

#### 1 ECONOMY-

sion and abrasion resistance long equipment life.

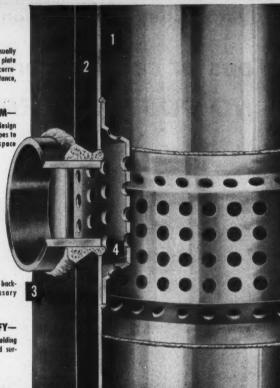
2 DESIGN FREEDOM-

Integral bond allows design and fabrication of shapes to meet process and space



EASY TO MODIFY-

Normal cutting and welding will not endanger clad sur-



#### STABILITY-

Low-cost carbon steel backing provides necessary ength and rigidity.

### CLAD STEEL EQUIPMENT ASSURES

### LONG LIFE AND EASY MODIFICATION

To help you overcome the rapid obsolescence caused by process changes when first costs are high, clad steel equipment offers two unique advantages. First, clad steel construction permits easy tank and vessel revision where new openings must be cut and flanges, pipes or attachments welded on. This means you can design for extra-long service life. The bond between cladding and backing will not tear away and allow harmful seepage.

Second, you get long-life protection from corrosion, abrasion and product contamination—all the advantages of solid, high-alloy construction—with savings up to 50% in material costs. The ASME Code permits full gage consideration for design purposes because cladding and backing are bonded over their entire surface.

Long life and low-cost protection, plus other advantages like fast heat transfer, easy cleaning and minimum maintenance, can be obtained from 16 cladding materials that meet a wide range of service conditions.

And qualified equipment builders know best how to apply these to your new processing equipment. By working with your own engineers and consultants from the start, they can help you get longer equipment life at lower cost. Lukens offers the widest available range of cladsstainless, nickel, Inconel, Monel, copper-and cooperates with fabricators in helping you to select the type best suited to your processing needs. If you would like more information, consult one of your builders or write Manager, Marketing Service, Lukens Steel Co., 750 Lukens Building, Coatesville, Pa.

### LUKENS CLAD STEELS

STAINLESS-CLAD · NICKEL-CLAD · INCONEL-CLAD · MONEL-CLAD

PRODUCER OF THE WIDEST RANGE OF TYPES AND SIZES OF CLAD STEEL PLATES AND HEADS AVAILABLE

When inquiring check CP 8534 opposite last page

#### CORROSION CONTROL

Saran and steel acid valve takes liquid corrosives at 1000 psi . . .

O-rings can be Teflon or resistant rubber

Designed primarily as a control valve for highly corrosive acid distribution lines, unit is suited for use in flow lines carrying any kind of corrosive liquid under high pressure.

Features: Valve is capable of withstanding pressures up to 1000 psi. It is made of homogeneous none-porous Saran plastic enclosed in a stainless steel jacket.

Saran plastic is insoluble in almost all common solvents and extensive tests have proved it ex-

tremely resistant to inorganic materials including acids and alkalis. Stainless steel jacket imparts added strength to valve body and simplifies attachment to control panels.

Valve tip is also made of Saran. This insures liquids flowing through the line will not corrode it nor themselves be contaminated by coming in contact with metal.

Incorporation of a synthetic rubber Oring in valve stem insures a perfect seal. In special ap-

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Stainless steel jacket adds strength to valve body

plications this O-ring can be Teflon or any other desired material. O-ring can be removed or replaced without detaching valve from flow system.

Description: High-pressure acid valve is currently available in two standard sizes with ports tapped for either 1/8 or 1/4" standard metal or plastic pipe. Larger sizes are available on special order.

For lines where pressures do not exceed 200 psi another model is available with O-ring seals in ports. This permits insertion of standard 1/4 or 3/8" Saran tubing or pipe directly into valve body through a flange fitted with a compression sleeve. Dimensions of valve are: height (including handle), 4"; valve body diameter, 1-5/8"; valve body length, 2".

(High-pressure acid valve, Model BX115, is manufactured by Exline Engineering Company, Dept. CP, 1636 East 6th Street, Tulsa, Oklahoma . . . or for more information check CP 8535 on handy form opposite last page.)

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Hydrofluoric acid under 60% won't attack polyethylene gas scrubber . . .

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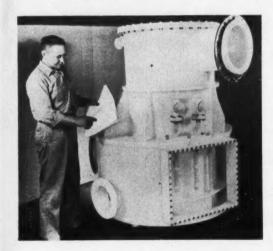
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4'-diameter unit handles flow of 2500 cfm

Unit illustrated below is made of polyethylene, and represents what is said to be the largest gas scrubber ever made from this material. Manufactured for a large chemical processor, this model measures four feet in diameter, and five feet high, with a gas flow of 2500 cfm at 1½ psi. It will be used in contact with hydrofluoric acid and fluorides.



Advantages of polyethylene for such equipment include its excllent impact strength and unbreakability, its desirable low-temperature properties, and its excellent chemical-resistance at temperatures up to 170°F.

Material itself is eight times lighter than steel and in similar fabrications, averages 1/3 the weight.

All appurtances normally required for process equipment such as ducting, piping, valves, centrifugal fans, and tower packing are also available in self-supporting fabrications made of polyethylene, and may be easily installed using hot gas welding process.

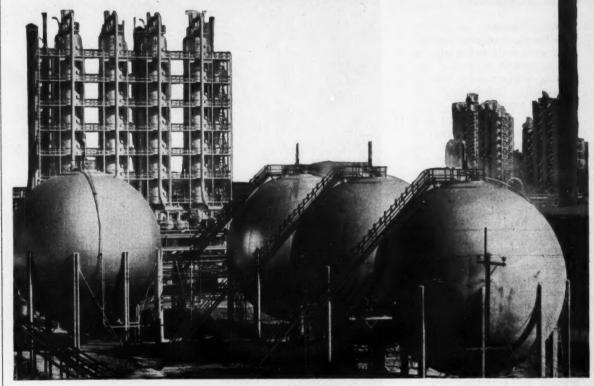
(Polyethylene gas scrubber is a product of American Agile Corporation, Dept. CP, P. O. Box 168, Bedford, Ohio . . . or for more information check CP 8536 on handy form opposite last page.)

#### **Tubing of Teflon offered**

Full line of thin and heavy-walled Teflon tubing is offered for application in chemical, petroleum industries.

(Teflon tubing is a product of Pennsylvania Fluoro Plastics Company, Dept. CP, 1115 N. 38th Street, Philadelphia 4, Pa. . . . or for more information check CP 8537 on handy form opposite last page.)

### PRODUCERS OF CHLORINE USE U. S. PERMOBOND® LININGS



Since Chlorine is produced under highly corrosive conditions and because United States Rubber Company's specially compounded Permobond #5471 proves superior for lining the amalgam type cells plus the piping and process tanks, then you can be sure that U. S. Permobond is the right lining for all chemical processes using this highly corrosive basic chemical.

Any original equipment requiring protection against corrosive attack can be lined with Permobond. You can also have Permobond installed on existing equipment—right in your own plant.

#### U.S. PERMOBOND PROTECTS AGAINST

- **WET OR DRY CHLORINE**
- TEMPERATURES UP TO 200°F.
- SATURATED CHLORINE SALT BRINE REGARDLESS OF CONCENTRATION

"U. S." has a field force of special sales engineers to solve your corrosion problems. Get in touch with them at the address below.

FROM EVERY STANDPOINT, PERMOBOND #5471 IS THE SUPERIOR LINING.



"U. S." Research perfects it ... "U. S." Production builds it ... U. S. Industry depends on it.

UNITED STATES RUBBER COMPANY MECHANICAL GOODS DIVISION . ROCKEFELLER CENTER, NEW YORK 20, N. Y.

Hose • Belting • Expansion Joints • Rubber-to-metal Products • Oil Field Specialties • Plastic Pipe and Fittings • Grinding Wheels • Packings • Tapes Molded and Extruded Rubber and Plastic Products • Protective Linings and Coatings • Conductive Rubber • Adhesives • Roll Coverings • Mats and Matting

When inquiring check CP 8538 opposite last page

Hot spray vinyl paint builds 3-mil film in one coat . . .

drying is quick, film is dense, impermeable

Uses: Protection of surfaces from the attack of most commercially used acids and alkalis, as well as alcohols, water, and oils. Coating, however, is not resistant to aromatic hydrocarbons, ketones, and esters.

Features: When applied in a hot spray, vinyl-based protective coating builds a 3-mil-thick film in one coat. It combines vinyl and other plastic resins to form a high-solids-content viscous material that reverts to a liquid form on the application of heat, thus avoiding use of excessive amounts of solvents to achieve spraying consistency.

Description: Vinyl-based coating is brought to a temperature of approximately 160°F in a standard paint heater for application. An air pressure of 20 psi forces heated paint to spray gun where it is atomized by 50 psi of air. As the hot paint leaves the spray gun, most of the incorporated solvents are evaporated and a thick, high-solids-content film is deposited on the target. Since little solvent remains in film, drying is quick.

(Tygon ATD vinyl-based protective coating is a product of The U. S. Stoneware Co., Dept. CP, 5300 Tallmadge Ave., Akron 9, Ohio. Check CP 8539 opposite last page.)

#### Shows pumps for acids

Features of 20-page bulletin include information and an outline drawing of corrosion-resistant pumps with standard stuffing box.

Bul W-350-B14B is issued by Worthington Corp., Dept. CP, Harrison & Worthington St., Harrison, N. J. When inquiring specify CP 8540 opp. last page.



### FACT:

### The new life-Line A is the most corrosion-resistant motor on the market

The corrosive action of chemicals takes a heavy toll on conventional motors. The new Westinghouse Life-Line® "A" motor offers more protection against corrosive atmospheres than any other motor you can buy. How?

Because the combined improvements in insulation, housing and bearing design give

unsurpassed protection against any contamination. It takes the right combination of such improvements in all three systems-electrical, mechanical and lubrication-to make the Life-Line "A" industry's most preferred power package.

Get all the facts by calling your Westinghouse sales engineer ... The Man With The Facts.

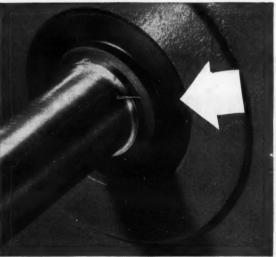
YOU CAN BE SURE ... IF IT'S

### Westinghouse





Mechanical System Fact-New cast-iron frames and brackets utilize the finest grained castings with uniformly thick wall sections precisely fitted and sealed. Molded glass plastic cooling fans on totally-enclosed types are chemically inert.



Lubrication System Fact-The new pre-lubricated Life-Line "A" bearing features a "4-way seal"-two seals on each side. Totally-enclosed types have additional neoprene flinger which assures bearing protection in any corrosive application.

When inquiring check CP 8541 opposite last page

Design of heat exchanger guards against expansion strains due to temp differences . . .

> stainless construction withstands corrosive products or atmospheres

Heating or cooling corrosive liquids or gases. Units may be installed where corrosive atmospheres are encountered.

Design of exchanger eliminates ex-Features: pansion strains due to radical temperature difference. Smooth flow end bonnets provide least possible impact on tubes and tube sheets at inlet to tube bundle.



Exchangers available in single- and multi-pass models

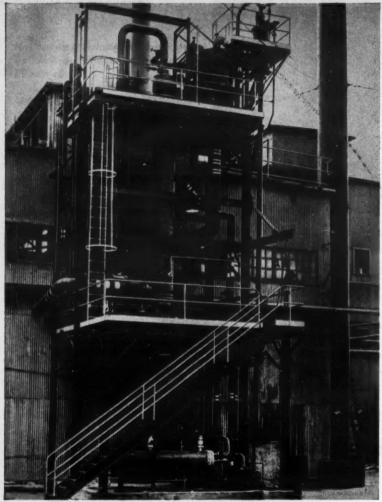
Material of construction is 316 stainless steel. Tubes are rolled into tube sheets by an electronically controlled process making a highly efficient joint.

Description: Fixed-tube-bundle exchangers are available in single- and multi-pass models in a large range of sizes and capacities. Specifications for the units, shell side and tube side, respectively, are: working pressure 300 psi and 150 psi; test pressure 500 psi and 300 psi; working temperature 400° F and

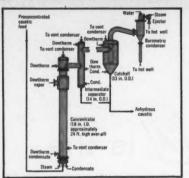
Single-pass units may be selected for easier piping arrangement and are suited where temprature difference of the two fluids is small. Multi-pass exchangers should be selected if water supply is limited, and where temperature difference between two fluids is

(Type SSF stainless steel heat exchangers are a product of Young Radiator Company, Dept. CP, 724 Marquette St., Racine, Wisconsin . . . or for more information check CP 8542 opposite last page.)

> This month's Data section begins on page 196.

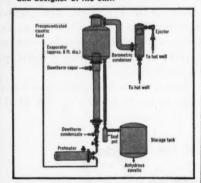


Nine years commercial experience in the continuous finishing of anhydrous caustic soda in this pioneer Swenson Evaporator shows • • •



Schematic drawing of pioneer Swenson Evaporator shown in photograph. Operators say continuous finishing is easy to control automatically and uses only ½ as much fuel as batch finishing.

The information on the continuous caustic finishing unit is published through the courtesy of the Swenson Evaporator Company and Dr. W. L. Badger, originator of the process and designer of the unit.



Schematic drawing of present simplified Swenson Evaporators. In these later units, jacketing is eliminated; thermal insulation prevents freeze-up. Low-carbon nickel tubes, tube sheets, shells and piping keep corrosion low and prevent product contamination.

# You don't have to "shade" solid NaOH made in nickel

What's more . . .

- With good control of chlorate, metal pick-up does not exceed 1 or 2 parts per million.
- Original equipment costs only 1/5 as much as a batch-finishing, directfired, iron pot installation of equal capacity.
- A set of nickel tubes can finish some 17,000 tons of caustic and costs less than 1/2 as much to replace as pots.

Modern practice is to produce 99.5% solid NaOH continuously in Dowtherm \*heated evaporators with contact surfaces of corrosion-resistant nickel. Feed is either 50 or 73% NaOH from which chlorates have been removed by chemical reduction.

"Shading" pots originally installed with the Swenson Evaporator shown, have never been needed. In later installations, caustic is packed directly from the nickel storage tanks without "shading" or final purification.

THE INTERNATIONAL NICKEL COMPANY, INC. 67 Wall Street New York 5, N. Y. For further information on continuous caustic finishing units, write Swenson Evaporator Company, Harvey, Illinois. For assistance with caustic corrosion problems, contact Inco's Corrosion Engineering Section.

\*Trademark of the Dow Chemical Company



CORROSION CONTROL

Offers low-cost protection for exterior metal work in one application . . .

bituminous alkyd-base coating flows easily, penetrates, and seals

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Uses: On exterior metal work such as stacks, tanks, railings, and poles.

Features: Coating can be applied after minimum surface preparation. It flows easily, penetrates and seals. One application is sufficient for most surfaces. It can be applied by brush, spray, or dip.

Description: Anti-rust paint dries to a semigloss finish. It will withstand temperatures up to 200°F and is resistant to sulfur, mild acids and alkalis, and a wide range of chemicals. It is compounded of bituminous alkyd base into which penetrating and waterproofing oils are blended.

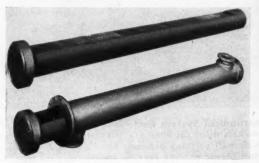
(CI-88 anti-rust paint is a product of Chem Industrial Co., Dept. CP, 3784 Ridge Rd., Brooklyn 9, Ohio. Check CP 8544 opposite last page.)

#### Severe shock, higher pressures handled by exchanger made of graphite

Uses: Heating or cooling corrosive liquids and gases. Exchanger is especially recommended for applications where excessive fouling on shell side is encountered, because all passages are easily accessible by merely sliding bundle out of shell.

Features: Simplified construction of unit utilizes a solid bar of impervious graphite measuring total bundle diameter. This bar is accurately drilled longitudinally and laterally. Design gives exceptional strength to bundle and permits use of chemically impervious graphite heat exchangers, even where severe mechanical shock is encountered, such as steam-hammer.

Exchanger will withstand operating pressure in the 150 to 200 psi range.



Exchangers can be used for heating or cooling corrosive liquids or gases

When inquiring check CP 8543 opposite last page

Description: Impervious-graphite bundle is made from graphite which is extruded, machined then impregnated with special resins. It is immune to the attack of all corrosives except a very few highly oxidizing agents. It has a high rate of thermal conductivity, is unaffected by thermal shock, and will withstand temperatures up to 340°F. (Higher operating temperatures can be accommodated by using a carbon-impregnated impervious graphite capable of withstanding temperatures up to 5700°F.)

Shells for these exchangers are supplied in impervious graphite, special alloys, copper, aluminum, or can be rubber- or lead-lined.

(Impervite Cross-Bore heat exchanger is a product of Falls Industries, Inc., Dept. CP, 31885 Aurora Road, Solon, Ohio . . . or for more information check CP 8545 on handy form opposite last page.)

Show excellent resistance to hot or corrosive liquids . . .

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baked-on epoxy-phenolic coatings adhere well to all metals with no primer required

Uses: Where hot and/or corrosive liquids must be stored or transported.

Features: Epoxy-phenolic coatings show maximum resistance to mineral, oxidizing, and organic acids, alkalis, and solvents. They adhere well to all metals with no primers required.

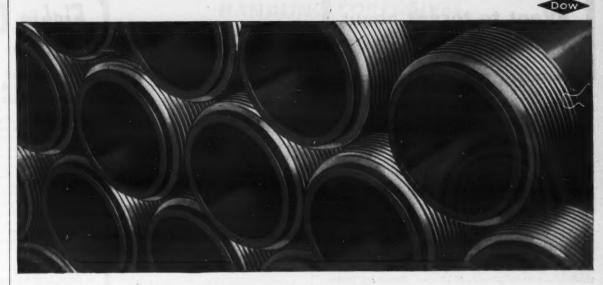
Coating materials are easily brushed or sprayed and form smooth, dense, pinhole-free films up to two mils. In most applications, only five or six coats are required to yield a dry-film thickness of six to seven mils. This makes possible sizeable savings in both material and labor costs.

Description: These coatings will not cure by air-drying. When final coating has been applied, entire system is baked-out until cured. Curing temperatures are from 310 to 450°F (metal temperature) and times from two hr to ten min. (Lankote Baking Vehicles, epoxy-phenolic coatings, are products of Lankote Division, J. Landau Co., Dept. CP, 221 Wooster Street, New York 12, N.Y. Check CP 8546 opposite last page.)

#### Catalogs stainless valves

Line of stainless steel valves, fittings, and accessories are given in octavo-size 64-page catalogue. Dimensions, design features are tabulated.

Cat 55D is issued by Cooper Alloy Corp., Dept. CP, 100 Bloy St., Hillside 5, N.J. When inquiring specify CP 8547 opposite last page.



### You Can See Why

### SARAN LINED PIPE

is your answer to downtime losses

It's made of corrosion-resistant saran pipe swaged right inside rigid steel pipe . . . two pipes in one for longest-lasting performance.

Here's really trouble-free piping . . . saran lined pipe, fittings and valves! This modern piping has a durable inner lining that eliminates shutdowns due to corrosion . . . forms tight-fitting joints that prevent leakage. Saran lined pipe, fittings and valves won't burst under working pressures up to 150 psi . . . and saran lined cast steel fittings are available for even higher pressures. Every single piece of saran lined pipe, fittings and valves is carefully spark-tested by hand to be sure there are no pinpoint holidays or cracks in the lining.

Installation costs are low with saran lined pipe, fittings and valves, too. They can be cut and threaded in the field with modified pipe-fitter's tools. And because they're rigid, few supporting members are needed.

If your operation requires the conveying of acids, alkalies, solvents and other corrosive liquids, be sure to investigate saran lined pipe, fittings and valves today. For further information, write the Saran Lined Pipe Company, 2415 Burdette Avenue, Ferndale 20, Michigan, Dept. SP529B-1.

RELATED SARAN PRODUCTS—Saran rubber tank lining • Saran rubber molding stock • Saran tubing and fittings • Saran pipe and fittings.

SOME OF THE MANY INSTALLATIONS USING

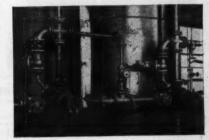
#### SARAN LINED

STEEL PIPE

Saran Lined Pipe is Manufactured by The Dow Chemical Company Midland, Michigan



Hydrochloric acid has been conveyed in this installation for well over seven years. Service has been eminently satisfactory.



Saran lined pipe is used here in an automatic water de-ionizer. This installation has also had a long record of uninterrupted service.

you can depend on **DOW PLASTICS** 



When inquiring check CP 8548 opposite last page

#### Want to forget about rust for 20 years?



Pure zinc or aluminum, molten-sprayed on iron or steel sur-faces, provides positive, dependable protection against atmospheric corrosion for upwards of 20 years without any further

These unique coatings are mechanically bonded to the surfaceadhesion is not dependent on volatile vehicles or binders. Scaling, crazing, blisters are eliminated. Protection is positive. "Metallize 'em and forget 'em!"

Why not find out more about how you can forget about rust on iron and steel structures and equipment—eliminate the nuisance and expense of constant painting and repainting? Write for descriptive Bulletin 62-B-it's free.

#### the Metco\* Systems

-a series of 18 basic engineering specifications developed over 19 years of experience with pure zinc and aluminum coatings on many different types of structures and equip-ment in a wide range of corrosive conditions. The Metco Systems provide for standardization of surface preparation, coating thicknesses and organic aftercoatings for various surface conditions and appearance requirements.



Interiors of these two steel 15,000 gallon sprinkler tanks were metallized with zinc in 1934 at the General Mills plant in Buffalo. Last inspected in 1950, no trace of rust could be

found, and zinc remaining is expected to provide protection for an additional 15 to 20 years.

See other examples of metallizing in Sweet's File for Plant Engineers Section 7a/Me

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THE	
400000	-

#### Metallizing Engineering Co., Inc. 1143 Prospect Ave., Westbury, L. I., New York . cable: METCO

In Great Britain: METALLIZING EQUIPMENT COMPANY, LTD.—Chobham near Woking, England

DON A WATSON METALLIZING ENGINEERING CO., INC.

1143 Prespect Ave., Westbury, Long Island, N. Y.

Please send me, without obligation, Bulletin 62-B.

Please have Metco Field Engineer call.

NAME. COMPANY ...

STREET

When inquiring check CP 8549 opposite last page

CORROSION

Long-lasting protection on edges, prominences, and crevices . . .

> resin coating has excellent flow qualities

Uses: Used with high bond primers, coating system protects metal, concrete, and wood structures exposed to corrosive fumes or chemicals.

Features: Coating provides long long-lasting protection to edges, prominences, and crevices, as well as to plain surfaces. Flow qualities are excellent.

Description: Pigment in coating includes titanium dioxide and carbon black. Vehicle contains chlorinated aliphatic hydrocarbon resin and chlorinated rubber. Solvent consists of aromatic and aliphatic hydrocarbons.

In a three coat system - one primer and two top coats - six mils dry film thickness is obtained. Coating contains over 60% solids by weight.

(Thick-Coat coating is product of Pennsylvania Salt Mfg. Co., Dept. CP, 1000 Widener Bldg., Philadelphia 7, Pa. . . . or check CP 8550 opposite last page.)

#### Includes "how-to" info on neoprene coatings

Seventh in "Language of Rubber" series, notebook includes case history information on liquid neoprene coatings in various applications involving hot caustics and acids. Cost studies and helpful "how-to" information is presented.

Other portions of booklet cover products of neoprene and tell how rubber industry runs its tests and what test results mean to engineers and designers.

Neoprene Notebook No. 60 is available from Rubber Chemicals Div., E. I. du Pont de Nemours & Co., Dept. CP, Nemours Bldg., Wilmington 98, Del. Specify CP 8551 opposite last page.

### Fights CORROSION HARD

ALPHA 101 AND 103 - Rigid PVC Plastic Pipe

#### Recommended for 3 out of 4 Chemical Lines

Good at licking corrosive problems. Mighty good for its perfect resistance to hydrochloric . . sulphuric . . nitric and more than 186 commonly used chemical corrosives - at lower

used chemical corrosives — at lower temperatures and pressures. When the right PVC Pipe handles your fluid lines you solve corrosion problems permanently! That's why ALPHA 101 Normal Impact Unplasticized Straight PVC

ALPHA 103 High Impact Un-plasticized Modified PVC Pipe is increasingly used! 1/2" to 4" sizes; full line of fittings.

- LIGHT WEIGHT
   EXCELLENT AGING QUALITIES
   NON FLAMMABLE
   HIGH TENSILE STRENGTH

Send for Complete Product Data Today

PLASTICS INC

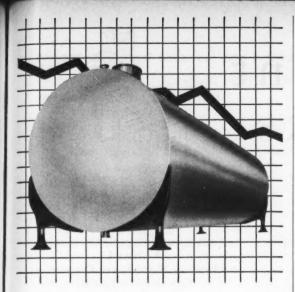
NORTHFIELD ROAD WEST ORANGE, N. J.

When inquiring check CP 8552 opposite last page

alphabetical index page 210



... for alphabetical index of all processes, materials, services, and equipment discussed in this issue's editorial columns and advertisements, turn to page 210. "Quick-locator" starting on that page was a feature in CHEMICAL PROCESSING years ago. It means extra work for the Editors, but it helps you, the reader, in finding what you want . . . in a hurry!



Here's a low-cost way

### to stop corrosion of storage vessels

Storing corrosive acids (or protecting sensitive and/or expensive solvents against metallic contamination) need not cost you a fortune for dependable storage vessels.

Sure, there is a wide choice of materials from which you can build storage vessels. But on a cost-service basis you just can't beat Pfaudler Glassed Steel Chemstor® Vessels.

Now let's examine that. First, both glass and steel are low-cost materials. Second, fusing the glass to steel storage vessels is not expensive. Result, a durable glassed steel vessel—at very reasonable cost.

Add corrosion resistance and you've got something. Two types of glass are applied, Pfaudler 28T, good for corrosives in tanks up to 15,000 gallons; the other, Pfaudler 28, for mild service—such as phenol, alcohol, formaldehyde, etc., for tanks up to 35,000 gallons.

What about cost? You can buy Chemstor vessels from 25c to \$1.00 per gallon, depending on size. This does give you a way to stop corrosion of storage at low cost. For complete specifications, send for Bulletin 918.

### Pfaudler

G



THE PFAUDLER CO., Dept. CP-8, Rochester 3, N. Y.

When inquiring check CP 8553 opposite last page AUGUST, 1955

### Cork in coating adds insulation to protection

Uses: In locations where metal tanks containing heated materials require corrosion protection as well as insulation to prevent major heat losses. It may be used where massive insulation, installed at much greater cost, is not required.

Features: Coating combines protection from corrosion with a moderate degree of insulation.

Description: Black in color, this protective coating is made from processed coal tar pitch, mineral filler, solvent, and granulated cork. Requiring no primer, one application of material produces a covering up to one-half inch in thickness.

(Bitumastic "K" protective coating is a product of Koppers Company, Inc., Dept. CP, Koppers Bldg., 13th Floor, Pittsburgh 19, Pa. . . . or for more information check CP 8554 on handy form opposite last page.)

#### Details on pumps for chemicals

Line of small rotary displacement and centrifugal pumps for chemical service is described and illustrated in four-page bulletin. Among models detailed are standard stainless steel, synthetic rubber and bronze low-volume pumps with interchangeable Teflon, Hypalon, neoprene, carbon or formica impellers for applications in the processing field.

Table of recommended uses, complete specifications for each unit and photographs of mountings and drives are also presented.

Bulletin on pumps for chemical service is available from Eco Engineering Company, Dept. CP, 12 New York Ave., Newark 1, N. J. When inquiring specify CP 8555 on handy form opposite last page.



Performance records plainly prove that this "John Crane" development has successfully solved the handling of the most difficult corrosive liquids and gases. Where conventional type seals had failed, the Type 9 has done the job. It continues to answer new problems, including temperature conditions from —120°F. up to 500°F.

Designed to withstand practically all chemicals, the Type 9 incorporates a flexible wedge ring and sealing ring molded from DuPont's Teflon. It is engineered for the particular application and can be furnished in the metallurgical specification best suited to the service.

Your toughest problem can be the Type 9's next success story. Use it on all rotating shaft applications, including: centrifugal, rotary pumps, mixers, agitators, autoclaves, other equipment.

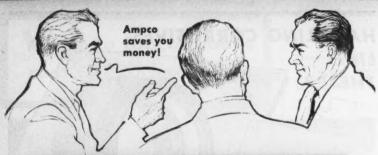


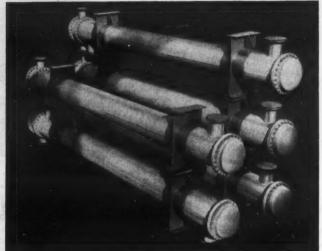
Get complete information on the Type 9 Seal from Crane Packing Co., 1821 Cuyler Ave., Chicago 13, III.

In Canada: Crane Packing Co., Ltd., 617 Parkdale Ave., N., Hamilton, Ont.



When inquiring check CP 8556 opposite last page





#### **AMPCO\*** Metal reduced costs 25% on Downingtown-built coolers

Pabricating these five 20" x 20' coolers from any alloy calls for real skill. But when a major chemical company asked if they could be built from Ampco 8, Downingtown Iron Works, Downingtown, Pa. had the answer. From previous experience with pressure vessels and heat exchangers, Downingtown knew how to fabricate Ampco Metal. That's why each of these 282 tube units is made completely from Ampco 8 - except the channel covers, which are Ampco-lined, and the bolts.

The saving in initial cost was a fat 25 percent. And these coolers will continue to yield savings for many, many years. Here's why:

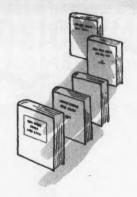
Ampco Metal has excellent corrosion resistance to many acids, caustics, and such troublesome media as polluted sea waters, bayou water, and plant waste waters. The material is ASME code-approved to 500° F. It has excellent heat-transfer rates. It is an alloy that withstands cavitation-pitting and erosion from suspended solids. And it's tough, maintaining good physicals at elevated temperatures.

Ampco Metal is available in most any form you need for economical fabrication. Start your savings program now by using Ampco Metal for your corrosion-resistant service. Write us for full details.



When inquiring check CP 8557 opposite last page

### Recent Books



Conveyors and Related Equipment

(Staff Review)

So rapid have been developments in the materials handling field that this originallycomprehensive book, by Wilbur G. Hudson, has been expanded over 25% to incorporate new developments since 1944. This manual will be equally useful to plant engineers seeking technical information and to student engineers looking for an understanding of applications of material handling equipment and storage methods.

Emphasis is on a practical approach to material handling. There are no long sections dealing with mathematical analysis and theory. The 524-page book begins with a discussion of general principles of material handling, discusses the various problems of material handling and then moves into separate sections on each kind of equipment. Tube conveyors, bucket elevators, skip hoists, bucket carriers, unit loads, different conveyors, storage and transport of bulk materials, weighing, chains, motors, etc., are all covered in separate sections. Cost factors are included wherever possible.

Especially helpful are various tables and graphs. Some of the items treated under these tables are carrying capacities, weights of materials, densities, operating cost estimates, characteristics of materials, recommended elevators for different materials, and belt speed and capacity data.

The photos are up to date and drawings are well executed and representative. Of special interest is the copious use of sizing and power requirement charts,

To obtain "Conveyors and Related Equipment" remit \$9 direct to John Wiley and Sons, Inc., Dept. CP, 440 4th Avenue, New York 16, N. Y. When inquiring specify CP 8558 on handy form which is located opposite last page.

Technique of Organic Chemistry, Volume I Physical Methods and Organic Chemistry - Part III

Reviewed by HILTON A. SMITH Professor of Chemistry University of Tennessee

The first volume of this series edited by Arnold Weissberger originally appeared in two parts in 1945-6. A second revised edition of the first volume appeared in two parts in 1949. In place of a third edition, the editor has chosen to add Part III to the first volume. Part III contains six chapters (XXXII-XXXVII) covering new subjects. These deal with the fields of electron microscopy, microspectroscopy, streaming birefringence, dielectric constant and loss, radiofrequency spectroscopy and neutron diffraction.

Part III also contains supplements to the following chapters of Parts I and II: VIII (Viscometry of Dilute Polymer Solutions), XVIII (Crystal Structure of Organic Compounds from X-ray Diffraction), XIX (Electron Diffraction by the Sector-microphotometer Method), XXIX (Determination of Magnetic Susceptibility) and XXX (Determination of Radioactivity by Scintillation Counting).

In present day organic chemical research, the use of physical methods has become virtually a necessity. In the new chapters, appropriate techniques are discussed in a thorough manner.

This 433-page volume together with others in the series should be invaluable to modern research workers in the field of organic chemistry.

To obtain "Technique of Organic Chemistry, Vol. I, Part III" remit \$8.50 direct to Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N. Y. When inquiring specify CP 8559 on handy form opposite last page.

## reviews of current technical and reference works . . . summarized for you by authorities in the field working with the CP staff

### Nomographs and Empirical Equations

(Staff Review)

Practical and easy to understand, this is one book on mathematics more interested in what can be done with math than in math itself. Having evolved as much in the plant as in the classroom, it stems from how-to do-it notes which Professor D. S. Davis began to collect 25 years ago.

In broad terms, it deals with two- and threevariable correlations through empirical equations, short-cut methods for interpolation, practical drafting hints for nomographs, and enough underlying theory to allow them to tackle plant problems judiciously rather than by the "seat of the pants."

While common problems are given a thorough treatment, tough problems ("bumped" data, sigmoid curves, graphical anamorphosis,) are singled out for solution. Much of this material is printed here for the first time in book form. Plenty of solved and answered problems are provided.

Though this book justifies itself in providing on-the-job help for any engineer who deals with data, it may also lure some readers into nomography as a hobby. (They have been called "nomogramaniacs".) The fun of flirting with mathematics, "the queen of the sciences," is a bonus added to the many useful ideas readers can pick up.

To obtain "Nomography and Empirical Equations" (236 pages) by D. S. Davis, remit \$6.75 direct to Reinhold Publishing Co., Dept. CP, 430 Park Avenue, New York 22, N. Y. When inquiring specify CP 8560 on handy form opposite last page.

#### Identification and Qualitative Chemical Analysis of Minerals

(Staff Review)

Chemical and physical analyses of over 2000 minerals, and means of identification, are presented in 385-page book by Orsino C. Smith. This second edition includes direc-

tions for using the Geiger counter for radioactive minerals, an expansion of the blowpipe section, and 28 full-page color plates depicting specimens, appearance of minerals that fluoresce under UV light, and beads, fused films and other blowpipe test results.

It is felt that the book would be more useful if minerals not found in North America would not be included. It would be clearer, too, if some explanation of the mineral index would be given.

Mr. Smith gives a good scheme of analysis, and describes in detail a field kit sufficient to perform such analyses.

To obtain "Identification and Qualitative Chemical Analysis of Minerals" remit \$7.50 direct to D. Van Nostrand Co., Inc., Dept. CP, 250 Fourth Ave., New York 3, N.Y. Specify CP 8561 opposite last page.

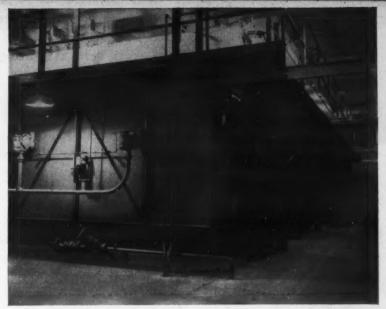
#### Patent Law in the Research Laboratory

(Staff Review)

Fourth in Reinhold's series of pilot books, this little volume of 145 pages serves to acquaint industrial research people with the workings of the patent system as it exists in the United States. In ten chapters, John Kenneth Wise deals with the history of our patent system, its reason for existence, devices that are patentable, the rights conferred by a patent, how patents are applied for and granted, transfer of rights, correction of mistakes, rival claimants, and the importance of records.

Bothersome technical terms are defined and explained; illustrations of patent procedure and law are documented with references to decisions of the courts. The chapter devoted to research records is especially helpful. Throughout the book informative answers are given to the many questions that occur to research people doing work that may lead to application for patents.

To obtain "Patent Law in the Research Laboratory" remit \$2.95 direct to Reinhold Publishing Corp., Dept. CP, 430 Park Ave., New York 22, N. Y.



Here are three Bros Packaged Watertube Boilers on the line at the Bell Aircraft, Kenmore, N. Y., plant. Steam generated is used primarily for

heat, some for processing. Maximum load is 28,000 lbs. of steam per hour at 50 lbs. pressure

## Solve steam problems quickly with BROS packaged boilers

● If you are planning a new plant ... expanding ... or replacing an old system, find out about the new Bros Packaged Boiler. Bros offers a compact, highly efficient unit, completely factory assembled and ready for simple service connections at the building site. The packaged units are primarily for medium loads; however, in multiples they replace the larger custom units and in so doing eliminate great expense.

No extended work interruptions

or erection problems are encountered when you install a Bros Packaged Boiler. It can be lifted or skidded into place. Costly foundations and accessories are not required.

Bros Packaged Boiler capacities run from 4,100 to 30,000 lbs. of steam per hour with design pressures up to 600 psi. Available with or without burning equipment, oil and/or gas. Choice of manual, semi-automatic or fully automatic controls.



#### WRITE FOR YOUR PERSONAL COPY OF THIS NEW CATALOG

This colorful catalog contains design features, construction details, drawings and specifications of Types W-1, W-2 and W-3 Bros Packaged Boilers. Get your copy for reference or file now!

#### POWER DIVISION - WM. BROS BOILER & MFG. CO.

1057 Tenth Avenue S.E.



Minneapolis 14, Minnesota

DESIGNERS AND MANUFACTURERS OF WATERTUBE BOILERS, 2-3-4 DRUM AND PACKAGED DESIGNS, AUXILIARY EQUIPMENT, AND A FULL LINE OF INDUSTRIAL STOKERS.

When inquiring check CP 8562 opposite last page

NG



When inquiring check CP 8563 opposite last page



Fig I—Fork truck picks up empty containers from outside storage



Fig 2—Filling cradle tilts container to 45° angle

# portable rubber warehouses simplify resin handling

Single collapsible container replaces 190 bags, eliminates product contamination, cuts handling manhours, and allows outdoor storage of material

Bakelite Company, a division of Union Carbide & Carbon Corporation, to cut handling costs, curb resin losses and contamination, has adopted a handling system built around giant rubber containers. The reusable containers have a capacity of 300 cubic feet, equal to about 190 conventional paper bags which they replace. Bakelite is presently using them to transport polyethylene resins between plants at South Charleston, W. Va., and Ottawa, Illinois.

Made of synthetic rubber (polychloroprene) and fabric, these air-tight containers are constructed like four-ply auto tires to resist puncture, high pressure, sunlight, moisture, and grease.

At South Charleston, lift trucks pick up empty collapsed containers at outdoor storage points (Fig. 1), and carry them to unit that inflates, washes, and airdries them. A monorail system moves the clean containers to a filling cradle that tilts to a 45° angle (Fig. 2). At container's true high point, its filling closure connects while under pressure with a filling spout through a special sleeve valve (Fig. 3). Rotary resin dispenser is lowered through the sleeve valve

before resins are poured into the container.

Lift trucks carry filled containers to a weighing station and then to storage until ready to ship.

When shipping containers, either a standard 52 ½ foot railroad gondola car, or an open-top truck trailer can be used with equal efficiency. To unload the containers from either conveyance takes about ½ hour. (Fig. 4)

Lift trucks carry the containers to a specially designed emptying fixture (Fig. 5). A sleeve valve similar to the one used for loading, connects to the container's closure. Material pours out of the container through the air-tight system (Fig. 6) and is ready for processing. When container is empty, it is removed from unloading fixture, collapsed, folded, and returned to a storage area to await shipment back to the South Charleston plant.

Air-tight, moisture-proof, and collapsed to a fraction of their original size, the containers can be stored outdoors with little or no surface preparations to protect them from weathering. On the basis of their experience so far, Bakelite estimates that use of the containers will result in a saving of 1/3c per pound of polyethylene resin.

(Seald-bins are products of the U. S. Rubber Co., Container Products Div., Dept. CP, 10 Eagle Street, Providence, R. I. . . . or for more information check CP 8564 on handy form opposite last page.)



Fig 3-Bag is filled through sleeve valve



Fig 4—To unload boxcar takes about 1/2 hour



Fig 5—Container nests in specially designed emptying fixture



Fig 6—Sleeve valve is also employed in emptying container. Operation is airtight

#### Allis-Chalmers presents the new

# ANOTHER BIG STEP AHEAD IN LOW-COST BULLDOZING



90 net engine hp 75 drawbar hp 20,500 lb

... with all the important performance advantages of Allis-Chalmers advanced basic design... tested and proved over millions of operating hours!

All-Steel Box-A Main Frame that soaks up shock loads, makes possible the service simplicity of unit construction.

Exclusive One-Piece Steering Clutch and Final Drive Housing with all final drive gears straddle-mounted on tapered roller bearings to insure long life,

Unit Construction lets you remove engine, master clutch, transmission, steering clutches and final drives without disturbing adjacent parts.

1,000-Hour Lubrication Intervals for roller bearing truck wheels, idlers and support rollers . . . makes production time out of service time.

Dual-Range Constant-Mesh Transmission lets you go from any forward speed to any reverse speed by shifting only one lever. Eliminates double shifting! That means faster work cycles . . . more production!

NEW STANDARDS OF PERFORMANCE AND LONG LIFE ON A WIDE RANGE OF JOBS

You owe it to yourself to investigate the performance advantages of the HD-11 . . . newest addition to the Allis-Chalmers leadership line. See your nearby Allis-Chalmers dealer now.

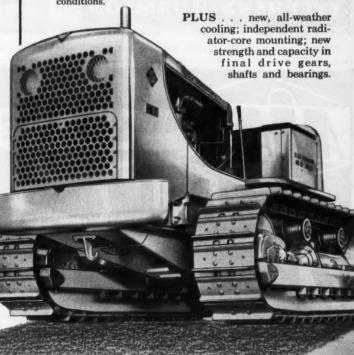
New Allis-Chalmers Diesel Engine with "follow-through" combustion and tornado turbulence . . . for smooth engine performance, cleaner combustion, extra long engine life.

New Wrap-Around Radiator Guard used as dozer lift frame to simplify design, reduce cost of bulldozer; guard tilts forward for easy service.

New Master Clutch with Ceramic Lining sets new standards of clutch life... with fewer adjustments required.

New Operator Convenience including roomy, flat platform... foam rubber seat... 24-volt direct electric starting... 60-gal, fuel tank.

Tough New Track — New design, through-hardened with extra toughness for long life even in severe abrasive conditions.



FILLIS-CHALMERS

G



dlem, else available.

③ PERMANENTLY SEALED... precision boil bearings are protected by a die-cest double lobyriath seel which will not correde or wear, insuring protection of bearings from dirt and

3 PRE-LUBRICATED . . . sufficient grease is sealed into each roller to last the normal life of the carrier—Alemite fittings also previde for easy re-lubrication.

(4) INTERCHANGEABLE ROLLERS . . . preedjusted 4" diameter rollers slide easily in or out of the hex-slots in the supporting brackets without tools.

Drawing shows spun end roller construction, die-cast labyrinth seals and precision ball bearings in position.

IN STOCK FOR IMMEDIATE DELIVERY!

WRITE FOR CATALOG 554

STANDARD PRODUCTS DIVISION

11 Ridgeway Ave.

Aurora, Itiical

When inquiring check CP 8566 opposite last page

How to PREVENT CONTAMINATION in your



Send for This Bulletin about BLAW-KNOX TIGHT-LIP BUCKETS

MATERIALS HANDLING

**OPERATIONS** 

BULLETIN 2378 tells how the "tight-lip" construction of Blaw-Knox Chemical and Fertilizer Buckets prevents costly

contamination caused by leakage of granular fines.

Blaw-Knox Buckets are designed with proper distribution of weight for maximum performance based on many years of intimate experience in the handling of various bulk materials in the chemical and fertilizer fields.

The wide range of available models permits a selection of the proper size, weight and type bucket to fit your installation requirements and obtain peak performance. Write for Bulletin 2378 today!

B L A W - K N OX C O M P A N Y
BLAW-KNOX EQUIPMENT DIVISION
Pittsburgh 38, Pa. • Offices in Principal Cities



BLAW-KNOX CLAMSHELL BUCKETS for the Chemical Industry

When inquiring check CP 8567 opposite last page

exposed bearings - they are available in open, cov-

ered pan and tubular types in a wide variety of

MATERIAL HANDLING

Glue applied automatically by conveyor unit . . .

applies two strips of special glue to bottoms of shipping cases, containers

Four foot section of conveyor eliminates manual glueapplying operation. It automatically applies two thin stripes of special glue to the bottoms of shipping cases as they come off conveyor line. This allows shippers to glue shipping cartons into solid loads that withstand shocks of transit.

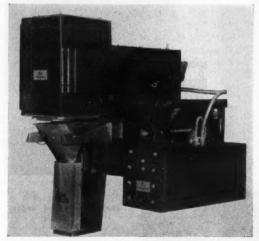
(Speedglu unit is a development of Speedways Conveyors, Inc., Dept. CP, 134 Speedways Building, 202-08 Rhode Island Street, Buffalo 13, N. Y.... or for more information check CP 8569 on handy form opposite last page.)

Feeds highly fluid powders to containers . . .

feeder handles products running from 8 to 135 pounds per cubic foot

Filling scale is designed to handle wide range of highly fluid powders running from 8 to 135 pounds per cubic foot. For materials which have a tendency to bridge, feeder can also be furnished with a small surge hopper containing an agitator.

Scale can also be furnished with a dust-tight bag holder for use when handling toxic materials.



Gross weighing scale handles products from 8 to 135 pounds per cubic foot

Other models of this scale can be used for filling one, two, five, and ten pound bags and the platform will allow the smaller unit to handle cans. The larger unit of these filling scales is now being used for filling 25, 50, and 100-pound bags for products such as insecticides, spray dried powders,



Photograph shows Ajax Lo-Veyor with screen for scaling or sizing materials while being conveyed. One Ajax Lo-Veyor performs two operations which ordinarily require two machines. Write today for Bulletin 39.

Representatives in Principal Cities

sizes.

AJAX FLEXIBLE COUPLING CO. INC. Westfield, N. Y.

When inquiring check CP 8568 opposite last page

rock dust, sugar, and other granular materials.

With these scales, operator merely positions empty containers and removes sealed containers.

(Model 700-G scale is a product of the Thayer Scale & Engineering Corp., Dept. CP, 494 E. Water St., Rockland, Mass. . . . or for more information check CP 8570 on handy form opposite last page.)

# Eliminates moving barrels apart before loading on truck . . .

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to

barrel cart requires no pick-up space with use of automatic clamping hook

Barrel-handling truck requires no tipping or pickup space when handling barrels touching each other. It is equipped with automatic spring actuator bar that allows hook to slip over barrel edge as truck is moved against barrel without operator touching either hook or barrel.

Design of cart includes tubular push-bar for use when tipping heavy loads. Bicycle handles are

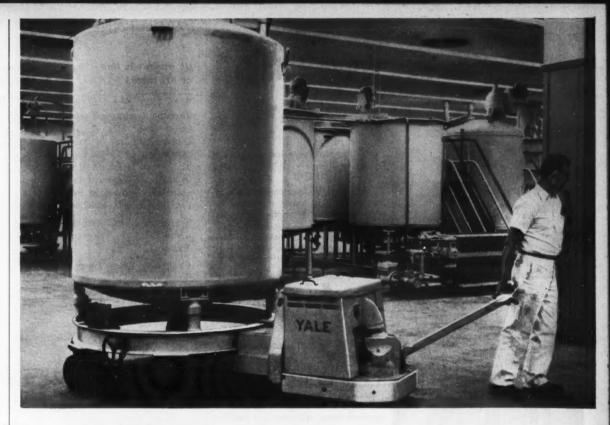


Cart (at left) in position for loading. Hook is ready to drop on to edge of barrel as cart is pushed forward. Hook (shown right) has engaged barrel. Operator does not touch either barrel or automatic hook

provided for easy handling of full barrels. Special kickstand is also incorporated on truck to allow it to stand in vertical position when not in use.

Frame of cart is of 1" pipe. It has 1" diameter axle. Wheels are equipped with roller bearings and 10" x 3" solid rubber tires mounted on semi-steel wheels. Pneumatic-tired wheels are available for movement over rough surfaces.

(Barrel Cart is a product of Valley Craft Products, Inc., Div. of O'Neil-Irwin Mfg. Co., Dept. CP, 760 Jefferson Ave., Lake City, Minn. . . . or for more information reader may simpy check CP 8571 on the convenient Reader Service slip which is located opposite last page.)



# Full 1,000 gal. tank gets smooth ride on Yale Worksaver

OTHER YALE TRUCKS HANDLE MANY MATERIALS FOR CHEMICAL PROCESSING PLANTS

This YALE platform-type Worksaver handles loads up to 7500 lbs. with smooth, easy power. It's a small, lightweight, maneuverable electric truck that does big-truck work in speeding the movement of heavy loads throughout chemical processing plants. Other YALE Worksavers are available in telescopic fork, pallet-handling and tractor models for fast, efficient handling in limited spaces and over low-load flooring.

YALE's complete line of Gas, Electric and Diesel Trucks and use-extending attachments meets every handling need of chemical processing plants. You can select exactly the equipment you require for your needs in handling everything from raw materials through finished products. Standout YALE features assure faster, safer, smoother handling—with maximum handling economies. Send coupon today for detailed information.

# YALE\* INDUSTRIAL LIFT TRUCKS AND HOISTS

Gas, Electric, Diesel & LP-Gas Industrial Trucks • Worksavers Warehousers • Hand Trucks • Hand & Electric Hoists

Roosevelt Boule	WNE Manufacturing Co., Dept. 12 vard, Philadelphia 15, Penna.
Gas Trucks	full information about YALE    Electric Trucks   Worksaver, and Trucks   Attachments
Company	
Company	Title
Name	

..... (MAIL THIS COUPON TODAY) .....

When inquiring check CP 8572 opposite last page



# Want to move things

#### For lifting or lowering floor-to-floor the INCLINEBELT

Continuous package conveying - a complete belt conveyor system or the Inclinebelt-complete, compact easy-to-install, electric-motor powered unit. High, continuous-line load capacity for any floor elevation. Available in belt widths of 8-12-14-18-24-30 and 36 inches.



#### For inclined or horizontal conveying . the UTILITY BELT-VEYOR

Conveys from floor-to-floor. Moves "packages" down, up or horizontally. Electric motor powered. Installs over existing stairways, or can be used as a portable Levelbelt conveyor. Four standard belt widths: 10-14-20 and 24 inch.



# horizontally

For straight line or inclined conveying assemble your own system or portable conveyor using HANDI-DRIVE pre-built units

These stock, pre-built conveyor units make it easy to assemble what you want in a conveyor. Converts existing gravity conveyor to power conveyor - quickly and at low cost. Can be installed as single portable unit or complete system.

#### Standard builds conveyors to speed any ONE or all THREE





#### GRAVITY & POWER CONVEYORS

ROLLER . SLAT . WHEEL SECTIONAL . BELT . CHAIN . PUSH-BAR

PORTABLE CONVEYOR UNITS:
HANDIBELT • INCLINEBELT • EXTENDOVEYOR • UTILITY BELT-VEYOR
HANDIPILER • LEVEL BELT • LITEWATE • HANDIDRIVE
PREUMATIC TUBE SYSTEMS

When inquiring check CP 8573 opposite last page

#### MATERIAL HANDLING

#### **UL** approves line of lift trucks

With UL-approval of its one- to three-thousand-pound capacity fork trucks, Yale Mfg. Co. has established a full line of hazard proof trucks in 1 to 10,000-lb capacities. This approval means all the trucks in series can be fitted to meet requirements recognized by National Fire Protection Association.

Trucks can be operated in locations where there are hazardous gas or dust atmospheres.

(Yale K51 Trucks are a product of the Yale and Towne Mfg. Co., Dept. CP, 11000 Roosevelt Blvd., Philadelphia 15, Pa. Check 8574 opposite last page.)

#### **Drum filler that's** fast, automatic

Automatic drum-filling machine which eliminates handling during filling operation is pictured and described in four-page bulletin. Manned by a single attendant, unit accepts drums, locates and indexes bung openings, fills, weighs, and releases drums at speed that assures maximum efficiency, economy at any rate of production.

Bulletin on automatic drum filler is available from The Rucker Company, Dept. CP, 4228 Hollis St., Oakland 8, Calif. When inquiring specify CP 8575 opposite last page.

#### **Booklet shows how trucks** speed handling

Illustrated 45-page catalog shows how trucks with detachable bodies can reduce labor and speed up operations in handling. Specifications, applications, construction, in-use photos and other data are included.

Catalog 352 is issued by the Brooks Equipment and Mfg. Co., Dept. CP, Knoxville, Tenn. Specify CP 8576 opp. last page.



# GIFFORD-WOOD CO.

HUDSON, N. Y. AND PRINCIPAL CITIES

When inquiring check CP 8577 opposite last page



#### Speeds your bulk handling

The Jaeger Auto-Scoop can make fast work of your bulk handling as it is doing here at Mansfield Brass & Aluminum Co., Mansfield, Ohio, where it unloads box cars, stockpiles, delivers molding sand to preparators, moves core sand, etc. That's because it's specially designed to work easily in narrow aisles, box cars and other tight places, turn short, carry faster and lower, dump higher and farther. Many other time-saving features. Write for Catalog L12-4.







Low bucket tilt-back assists full-bucket loading, permits carrying as low as 41/4" from ground.

(6'6"). Faster speeds to 13.88 mph in reverse, 7.66

Higher clearance (6'8"), more reach (2'7").

1 cu. yd. Load-Plus available for bigger work. THE JAEGER MACHINE CO., '616 Dublin Ave., Columbus 16, Ohio

When inquiring check CP 8578 opposite last page

# DO YOU REQUIRE ACCURATE SIZING OF GRANULAR MATERIALS?

If you process granular materials that must be uniform in length, width, or thickness, Hart-Carter sizing machinery may be what you need.

Hart-Carter makes several types of equipment that accurately sizes or separates by means of pocketed Carter discs or indented Hart cylinders... or by cylinders perforated with either slots or recessed round holes. These principles and methods are described in folders CPG-2 and L-1, which we'll be glad to send to you.

Information you supply our technicians about the in-put materials to be sized, and the "product" specifications, will enable them to make sound recommendations. (Such information will be kept confidential, of course.) Tests in the Hart-Carter Laboratory are free.

Write today for folders CPG-2 and L-1

# HART-CARTER

COMPANY

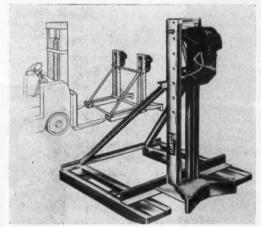
677 19th Avenue N. E. MINNEAPOLIS 18, MINNESOTA

Since 1919 . . .
Engineers and Manufacturers of Machinery for Separating and Sizing Granular Materials

When inquiring check CP 8579 opposite last page

Eliminates removing forks when handling drums with fork truck

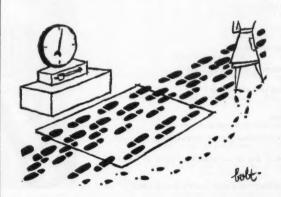
Mounting has been designed for use with drumhandling attachments, eliminates necessity of removing forks when handling drums. Fabricated to any size fork dimensions, can be made to accommodate from one to three drum-handling units.



Mounting allows handling of drums without removing forks from truck

Units can be permanently spaced for fixed diameter drums, mounted to be adjustable for drums of various diameters. Mounting is picked up in same manner as a pallet, entering forks into slots. No fastening devices are necessary.

(Mounting is a product of Marvel Industries, Inc., Dept. CP, 2224 Cleveland St., Evanston, Ill. . . . or for more information check CP 8580 on handy form opposite last page.)





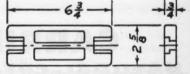
This simple ball type pneumatic vibrator operates dependably and effectively although exposed to temperatures between 600 and 750 degrees.

# AiroViber moves bulk materials successfully regardless of high temperatures

A West Coast plant of Barium Products Ltd reports they experienced a problem in moving materials from bins to electric furnaces, each bin being located adjacent to the furnace it feeds. To encourage free flow, it was decided to utilize vibration. Two Model B15 Airo-Viber vibrators on each bin operating in temperatures approaching 750 degrees produce desired movement of materials. When fully loaded, a bin weighs approximately 40 tons.

Barium found Viber's Mounting Plate No. 6006, to be advantageous because solid mounting of vibrator on bin increases effectiveness of vibration.

This modern method of external vibration can be used to good advantage in loading, unloading, moving, packaging, processing, grading or separating bulk materials. The simple design provides only one moving part, a heavy steel ball running on a circular track. Fool-proof operation is afforded because it has no close fitting parts to lubricate or adjust.



Optional mounting plate simplifies mounting. Two T-slot bolts hold vibrator solidly against plate.

AiroViber is a product of Viber Company, leader in the field of vibration. For further information write: Viber Co.,726 So. Flower St. Dept. 79, Burbank, Calif.



AiroViber's simple construction requiring no close clearances assures trouble-free operation.



CONCRETE VIBRATORS SINCE 1931

When inquiring check CP 8581 opposite last page

G

# GOT AN "IMPOSSIBLE" **CONVEYING JOB?**

ARRIER Natural-Frequency Conveyors (BOTH borizontal and vertical) have all but revolutionized an important branch of the conveyor industry, and they bave done it by accomplishing "impossible" results on toughest products and processes.

Natural-Frequency Conveyors differ from all other vibrating conveyors. Carrier Conveyors utilize the scientific laws of Natural Frequency, substituting the natural resonant action of springs for brute force. By using this harmonic Natural Frequency instead of "fighting it", Carrier Conveyors offer advantages so amazing as to seem impossible until you have experienced them.

Carrier Natural-Frequency Conveyors are now delivering spectacular performances for scores of America's biggest, most successful industrials. Mail the coupon today for all the facts!

#### For Instance - Rocket Fuel Conveyed Safely By Unique Carrier Spiral!

CARRIER

NATURAL-FREQUENCY-

CONVEYORS

Without obligation, please send me Carrier Natural-Frequency Conveyor

State

Rocket fuel powder is as temperamental and dangerous as a land mine. It's hydroscopic, quickly builds up heavy static electricity. Even the slightest contact with oil or grease will create a hazard. It is obviously a conveying nightmare for the man-

Handling (and elevating) rocket fuel is a cinch for the Carrier Spiral Vibrating Conveyor shown above. The

Carrier Conveyor Corporation 219 N. Jackson St., Louisville 6, Kentucky

powder is elevated through that totally-enclosed, spiralling, stainlesssteel tube-elevated quickly, gently and safely, in a grounded, air-tight, self-cleaning conveyor.

This is just one of many unusual problems solved by a Carrier Natural-Frequency Conveyor, Tell us yours and see what we can work out for you. There's no obligation,



#### CARRIER ADVANTAGES

HIGH CONVEYING SPEED (Up to 100 feet per minute)

(Up to 200 tons per hour)

LESS POWER REQUIRED
(About one-third as much as "competitive" equipment)

LESS MAINTENANCE & DOWN-TIME (Less power + good design = trouble-free performance)

NO DAMPENING UNDER LOAD

(Designed with extra power for specified load, with positive stroke)

SELF-CLEANING (Continuous, smooth trough — no pockets)

COMBINES PROCESSING WITH CONVEYING (Can screen, dry, cool, dewater, blend, etc.)

WIDTHS FROM 6" TO 48"—LENGTHS FROM 5' TO 250'
(With pans 16 ga to ½" plate, of any metal, open or enclosed)

BALANCED, VIBRATION-FREE UNITS AVAILABLE (For use on ceilings or light floor construction)

When inquiring check CP 8582 opposite last page

#### MATERIAL HANDLING

### Containers are part of flatcar, eliminate weigh bins

system allows one man unloading at rate of one ton per minute

By making large aluminum containers an integral part of a flatcar, tare weight of these containers is not changed in either direction. This is the reasoning behind the development of a new railway container car by Shippers' Car Line Corporation of New York.



RU

One man unloads better than 1.3 tons of material/min

Twenty-eight separate, removable containers are securely mounted and locked in place on a flatcar. When in place, containers are, actually, a super-



Container car holds 28 containers, roughly 50 tons of the average bulk material

Street. City.

Att. Mr.



at

ral

RUBBER TREADS . . . a wide choice of treads suited to all types of floors, including Darnelloprene oil, water and chemical-resistant treads, make Darnell Casters and Wheels highly adapted to rough usage.

RUST-PROOFED . . . by the Udylite process, Darnell Casters give longer, care-free life wherever water, steam and corroding chemicals are freely used.

STRING GUARDS . . . Even though string and ravelings may wind around the hub, these string guards insure easy rolling at all times.

LUBRICATION . . . all swivel and wheel bearings are factory packed with a high quality grease that "stands up" under attack by heat and water. Zerk fittings are provided for quick grease-gun lubrication.

Darnell Casters and Wheels
AlWays

and ROLL

Free Manual

DARNELL CORPORATION,

DOWNEY ILOS ANGELES CONTETT CALIFORNIA 80 WALKER STREET, NEW YORK 12, NEW YORK 28 NORTH CLINTON STREET, CHICAGO & ILLINOIS

When inquiring check CP 8583 opposite last page

structure of the car; when removed, they become 28 portable discharge hoppers.

On trial runs, one man unloaded 84,000 pounds of material in 33 minutes. This rate of approximately 1.3 tons per minute was achieved with the aid of a small fork lift. Normally it takes about 12 manhours to unload an equivalent amount of material in 100-pound bags.

Other advantages of the system are that contamination and deterioration of products are eliminated, containers can be used for storage while awaiting use in process, and opening, emptying, and disposing of paper or cloth container is eliminated.

(Containers are a product of Tote System, Inc., Dept. CP, 700 S. 7th St., Beatrice, Nebraska. Check CP 8584 on handy form opposite last page.)

#### Lifts, up-ends, and dumps free-flowing materials at 15 tons/hr rate

Portable skip hoist and dumper lifts, up-ends, and dumps any free-flowing materials at rates up to 15 tons per hour. It can be adapted to handle bags, boxes, drums, barrels, special containers.

Dumper is powered by a ½-hp electric motor, oneor three-phase; pulley and cable lift arrangement



Portable skip hoist and dumper can be adapted to handle bags, boxes, drums, special containers

is pushbutton-controlled. It is caster-mounted for portability. Units are built in standard dumping heights from two to seven feet. Base is 36 inches by 46 inches.

(Dumper is a product of Colson Equipment & Supply Co., Dept. CP, 1317 Willow St., Los Angeles 13, Calif. Check CP 8585 opposite last page.)



## new Baker

# **E**HOVELOADER

## saves up to \$400 on initial cost

Now you can mechanize your bulk handling operations for less than \$10.00 per day for one year . . . much less than you pay a laborer with a hand shovel!

This rugged Model 20 Shoveloader has a lifting capacity of 1500 pounds, and lifting height of 7 feet. Standard bucket size is 12 cubic feet. Loader arms are in *front* of operator—not around him—protecting him from injury and providing full 360° visibility at all times.

Four forward speeds with top travel speed of 14 MPH make this a *fast* machine and insure better operation on ramps and rough ground conditions.

Bucket tilt-back at ground level means a full load at every grab, and permits low carrying position for travel. Other advantages are longer forward reach, greater longitudinal stability, extremely low maintenance because of easy accessibility of all parts requiring service, and design of the husky, trial-proven engine.

Special attachments are available for special jobs—forks for palletized loads, crane hooks for hoisting, and special buckets for dense materials. Catalytic exhaust system is available for inside work, where required.

Compare these and Shoveloader's many other features with loaders costing \$350 to \$400 more! Write for complete information. The Baker-Raulang Company, 1208 W. 80th St., Cleveland 2, Ohio.



55 B

When inquiring check CP 8586 opposite last page

V G



# Means continuous production with no tear, less wear on Cambridge WOVEN WIRE CONVEYOR BELTS

No seams to tear! No lacers to wear! No fasteners to cut the belt! There are no weak spots in Cambridge belts because the ends are joined the same way the belt is made . . . you're assured of smooth, trouble-free operation.

Whether you're designing machines for your own operation or for resale, you can eliminate batch handling, cut costs, provide continuous production at controlled rates of speed with moving woven wire belts.

All-metal Cambridge Woven Wire Conveyor Belts are corrosion resistant and impervious to damage from constant operation at temperatures from sub-zero to 2100°F. Open mesh construction lets process atmospheres circulate freely for uniform cooling, heating, drying . . . provides flash drainage of solutions, rapid washing, quenching, cleaning, draining.

No matter how you look at it, CAMBRIDGE Woven Wire Conveyor Belts are invaluable aids to AUTOMATION...help beat your biggest competition, COST. They are made in any size, mesh or weave, from any metal or alloy. Special raised edges or cross-mounted flights are available to hold your product during movement.



Call in your Cambridge Field Engineer to discuss how you can cut ultimate costs by continuous operation. You can rely on his advice. Write direct or look under "Belting, Mechanical" in your classified telephone book.

BAGGED CEMENT
... Smooth belt
won't tear package. Spillage
sifts through
open mesh to

ASK FOR FREE 130-PAGE REFERENCE MANUAL illustrating and describing woven wire conveyor belts. Gives mesh specifications, design information and metallurgical





WIRE

METAL CONVEYOR BELTS

SPECIAL METAL FABRICATIONS Department F, Cambridge 8, Maryland

OFFICES IN PRINCIPAL INDUSTRIAL CITIES

When inquiring check CP 8587 opposite last page

#### MATERIAL HANDLING

Explosion-proof level control handles material densities from 5 to 500 lb/cu ft . . .

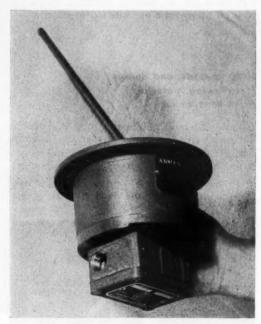
bin material actuates explosion-proof switch

Uses: Level control for explosive materials as flammable dusts, wood, flour, sugar, plastics.

Features: Unit uses explosion-proof microswitch to control levels of dry and wetted materials with densities from five to 500 lb per cu ft.

Description: Sensing probe contacts material and is linked with micro-switch. Flexible sphere

seals switch-housing from dust, moisture, materials.



Stainless steel probe controls bin level

Housing is bolted to outside of bin or chute with probe extending into bin through hole in bin-wall. Hole is about 23/8" diameter, large enough for flexible sphere. Electrical contact is broken when material pushes outer end of probe downward. Probe rod is stainless steel. Sphere is buna-S, buna-N, or neoprene.

(Explosion-proof level control is product of Scrayco, Dept. CP, 201 Greene Ave., Bound Brook, N. J. Check CP 8588 opposite last page.)

Solubility of Hydrogen in Iron is determined in nomograph on page 200





Literature on request.



2706 Clinton Ave. . Cleveland 13, Ohio

When inquiring check CP 8589 opposite last page

CHEMICAL PROCESSING

AU

#### Eliminating clutch and transmission reduces maintenance problems on gas-electric truck

Performance features of a gas engine are combined with economy of an electric truck in 3000-lb truck. Clutch and transmission, usual source of maintenance and replacement problems, have been replaced as well



3000-lb truck utilizes variable-voltage generator integral with gasoline engine

as gear-shifting. Truck features foot-pedal-operated electrical inching control permitting high-speed hoisting at low travel speeds. Travel speed is regulated by accelerator pedal.

Power unit is Hercules heavy-duty four-cylinder industrial engine. Hydraulic system is low-pressure with a continuous flow pump supplying oil to lifting and tilting cylinders. Speed is controlled by a metering valve, with excess oil by-passed to the reservoir.

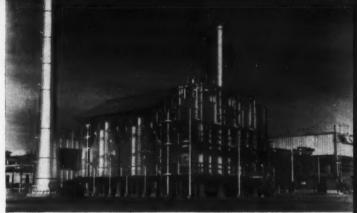
Maximum travel speed with a full load is eight miles per hour. Full-load lifting speed is 40 fpm. Total lift height is 130 inches.

(Model FD-30 truck is a product of Baker-Raulang Co., Dept. CP, 1250 W. 80th St., Cleveland, Ohio . . . or check CP 8590 opposite last page.)



## More chemicals for safety on the highway

Silicone treatment of highway pavement and bridge structures on the N.Y. State Thruway will greatly extend the useful life of the concrete and improve road visibility for motorists, according to reports on tests made by General Electric and the N.Y. State highway departments. Silicone chemicals prevent spalling of concrete surfaces, particularly under winter conditions. They also prevent water from soaking into the concrete; however, the treated surface is not slippery even during or after a rainfall.



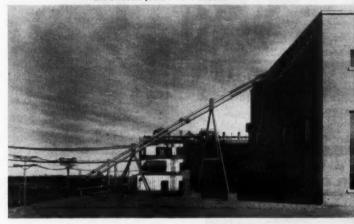
A general view of the Canadian Industries (1954), Ltd., plant in Edmonton, Alberta, where polythene resin is produced.

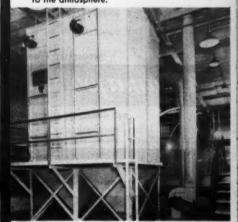
Material introduced into conveying lines is blown 400 feet to storage. System requires minimum space—walls or floors present no obstacles.



Two Dracco Uni-Filters purify all conveying air before use. Positive-displacement blowers provide the moving stream of conveying air.

Dracco Filter collects particles carried over from storage operation—only clean air is exhausted to the atmosphere.





# Airstream\_handling keeps product pure

Problem—to convey cubes of chemicallypure polythene resin from process to storage without contamination at the Canadian Industries (1954), Ltd., plant in Edmonton, Alberta. Foreign matter, even in minute quantities, seriously affects the quality of this material.

Solution—a Dracco Airstream Conveyor which blows the material from end-of-process pick-up points to the storage warehouse, a distance of some 400 feet. Because the entire system is enclosed and conveying

air is filtered before use, all contaminants are eliminated. There are no metal-to-metal moving parts coming into contact with the product.

Result—Airstream has afforded economical, contamination-free conveying. Operation of the entire system requires only the part-time attention of one man. The conveying air is also filtered after use, eliminating material waste and plant clean-up worries.

Airstream Conveyors are designed to

handle any dry, bulk granular or powdered material economically, automatically and with a maximum of plant safety. To find out how Airstream can improve bulk materials handling in your plant, consult a Dracco engineer today!

# DRACCO CORPORATION 4070 East 116th St. • Cleveland 5, Ohio

For further information on bulk materials handling with Dracco "Airstream" Conveyors, send today for Bulletin 529.



When inquiring check CP 8591 opposite last page

G



Kalamazoo TILE STORAGE BIN is your best buy:

- 1. CORROSION-RESISTANT.
- 2. MOISTURE PROOF.
- 3. FIRE-PROOF, WEATHER-PROOF.
- 4. KEEPS CONTENTS CLEAN.
- 5. PROTECTS AGAINST THEFT.
- 6. GREAT LOAD-BEARING STRENGTH.
- 7. MANY SHAPES AND SIZES.
- 8. REQUIRES NO MAINTENANCE.
- 9. LONG LIFE.

Bulletin 1153-B

gives you the

complete story.

Send for your

copy today.



# Kalamazoo TANK and SILO COMPANY

845 HARRISON STREET - KALAMAZOO, MICHIGAN

When inquiring check CP 8592 opposite last page



THAT IS A STRONG **ENDORSE-**MENT OF

little maintenance under rigorous and exacting conditions for long periods of time.

The fact that it measures up to these requirements is best evidenced when purchasers return to the same manufacturer when additional cranes are needed.

We are in a position to submit what we sincerely believe to be an unexcelled record of repeat orders as evidence of the continuing high quality and tangible value of Euclid Cranes.

> The EUCLID CRANE & HOIST Co. 1368 CHARDON ROAD CLEVELAND 17, OHIO

When inquiring check CP 8593 opposite last page

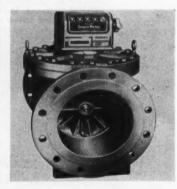
#### MATERIAL HANDLING

#### **Develop petroleum meters** which can handle 22,000 gpm

Uses: For loading and unloading of ships, barges, tankcars, pipeline services, refinery applications and process and blending systems.

Meters comprise six new models with capacity ratings ranging from 3000 to 22,000 gpm.

Description: Meter consists of two counter-rotating dynamicallybalanced rotors. Flow through rotors is equalized so that velocity



at center of rotor and outside is the same. Liquid is deflected from first rotor to second rotor, entering the liquid in the second rotor at a 90° angle to the base of the

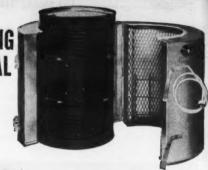
(Duo-Rotor meters are products of Granberg Corp., Dept. CP, 1308 67th St., Oakland 8, Calif. . . . or for more information Check CP 8594 opposite last page.)

#### Catalog shows complete line of industrial trucks

Illustrated 64-page catalog describes line of platform trucks, two-wheel hand trucks, shelf and tray trucks, box trucks, wagon trucks, skids, dollies, etc. for industrial, commercial use.

Catalog No. 100 is available from Hamilton Caster & Mfg. Co., Dept. CP, 1700 Dixie Highway, Hamilton, Ohio. When inquiring specify CP 8595 opposite last page.

# IN METAL DRUMS



# Automatic

A PORTABLE ELECTRIC OVEN in two models for 55 or for 30 gallon

Saves Time-Saves Money. Makes removal from drum by dipping, pouring or pumping, easy and convenient, for any viscous material that handles better when warm.

Operates automatically and economically. Two hinged halves, well insulated, fit around drum at point of use-eliminates handling hot drums. Supplied for 115, 208, 230 or 460 volts, single, or three phase. Catalogue, prices and specifications on request. Write today!



COMPANY

2980 West Davison Ave., Detroit 38, Michigan, Phone Tulsa 3-1100

When inquiring check CP 8596 opposite last page





WRITE FOR COMPLETE CATALOG

B/W CONTROLLER CORPORATION

2204 E. MAPLE ROAD BIRMINGHAM, MICH

FIRST IN THE FLOATLESS CONTROL FIELD

When inquiring check CP 8597 opposite last page

AU

#### Shows liquid height in vented tanks as well as those operating under pressure or vacuum

Uses: For use on pressurized tanks or tanks that operate under vacuum.

Features: Gage has an external fuel resetter so it's not necessary to open indicator case to check or reset the zero. Nothing is required within tank except suitable length of pipe or tubing for an air chamber.



ping, erial

dayl

Gage can be used on any tank, regardless of how high pressure may be

Description:

Remote reading tank gage is bellows-actuated and uses two lines to tank. One is connected with an air bell and other is an equalizing line connected to vapor space. In operation, pressure-responsive element is a bellows, position of which varies with head of liquid in tank. Motion of bellows is

conveyed out of the pressure-tight indicator housing by use of a magnetic coupling that actuates pointer through a sector and gear.

This feature makes it possible to use this gage on any tank, regardless of how high the pressure may be. It may also be used on tanks operating under alternate pressure and vacuum.

All parts are of non-corrosive material. Operation is entirely automatic when actuated by a continuous air supply.

Dials can be furnished graduated in any unit of liquid measure, and where desired, luminous treatment can be applied both to graduations and tank legends. Two-scale dials are also available. Gage is equipped with 12" dial with large graduations and pointer travel of approximately 30".

(Levelux gage is a product of the Liquidvision Gauge and Control Corp., Dept. CP, P. O. Box 51, Oceanside, Long Island, N. Y. . . . or for more information check CP 8598 on handy form opposite last page.)

Does your plant need modern material handling methods . . . ?

check the handy Product Directory (pages 210 to 212) for a quick reference to ideas and equipment in this issue.

when

Time

is important

in handling dry materials in bulk

... call on

Fuller

... pioneers in harnessing AIR



ime is industry's most important asset.

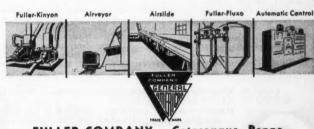
When time is used wisely, the more time you save, the more money you make.

Put a stop-watch on every step in your present handling of dry materials in bulk (a non-productive but essential function.) You'll probably agree it could be better, much better.

If so, don't shudder. Instead, get in touch with Fuller, who will be glad to make a realistic appraisal of your materials handling problem. Be sure to ask for Fuller's interesting brochure called "How to Pull Dollars Out of Thin Air."

Depending on the materials involved and your plant layout, there's a fine combination of Fuller systems (Fuller-Kinyon, Airveyor, Airslide, Fuller-Fluxo,) best suited to save your time and temper, improve your efficiency and your outlook.





FULLER COMPANY, Catasauqua, Penna.

GENERAL AMERICAN TRANSPORTATION CORPORATION SUBSIDIARY

Chicago · San Francisco · Los Angeles · Seattle · Birmingham

When inquiring check CP 8599 opposite last page

V G



#### ADVANTAGES OF NEFF & FRY BIN CONSTRUCTION

The photo shows a Neff & Fry Bin being erected alongside another which is completed.

A course of tongued and grooved staves has just been laid up and the steel hoops are being adjusted. Observe that the stave ends are diagonal. All stave ends in a horizontal joint are supported by a hoop, not possible if the staves were rectangular.

Between the joint hoops as many intervening hoops are installed as needed to effect a five-toone safety factor.

Because of this unique construction, Neff & Fry Bins have extraordinary strength and durability. They last for decades with little or no maintenance expense. They do not spall, rot, rust, or burn. If you have flowable bulk ma-

If you have flowable bulk materials to handle and store, it will pay you to read our folder, "Bins With the Strength of Pillars." Ask us for a copy.

#### THE NEFF & FRY CO. • 166 Elm St. • Camden, Ohio

Not exported except to Canada and Mexico

#### SUPER-CONCRETE STAVE STORAGE BINS

When inquiring check CP 8600 opposite last page

Don't waste production time!

feed bulk materials at controlled capacities with

# DRAVER FEEDERS

You can safely operate sifters, elevators, grinders, dryers and other production equipment at maximum efficiency without danger of over-loading, when you regulate capacity with an accurate, dependable Draver Feeder. You save power and production time, and avoid excessive wear on your equipment.

Sturdy Draver Feeders are made in more than 100 sizes and models, to

feed a continuous, uniform stream of most any dry powdered, granular or crystalline material — even stubborn, nonfree-flowing products. Original cost and operating expense of Draver Feeders are low, compared with the production losses they prevent.

Send data on your capacity regulating requirements, and let our engineers give you detailed information and specifications. No obligation.

Complete information and recommendations on request. Write today.



FEEDING · MIXING · SIFTING · GRINDING · WEIGHING · PACKING and PACKAGING EQUIPMENT FOR THE PROCESS INDUSTRIES

## B. F. GUMP Co.

Engineers and Manufacturers since 1872

1344 S. Cicero Avenue, Chicago 50, Illinois

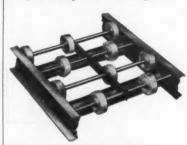
When inquiring check CP 8601 opposite last page

#### MATERIAL HANDLING

# Combine nylon, aluminum in conveyor design

Uses: For conveying material where resistance is desired to detergents, salt water, fruit acid, and lactic acid. It can also be used in outdoor applications.

Features: Conveyor uses nylon plastic wheels running on nylon bearings mounted in aluminum frame. This provides a unit 20% lighter than an all aluminum conveyor of equal load rating.



Can be used outdoors

Description: Aluminum and nylon conveyor unit is furnished in standard 12, 15½, 18½, and 24" widths; 5 and 10' straight sections; with 38¼, 61½, and 91½" (outside radius) curves.

(Nylo-Wheel conveyor is a product of the Metzgar Conveyor Co., Dept. CP, 449 Douglas St., N.W., Grand Rapids 4, Mich. Check CP 8602 opposite last page.)

## Speeds loading of drums onto trucks

To speed loading and unloading of drums and gas cylinders, an electric hoist and boom unit has been developed. Unit has six-volt electric motor which operates from standard battery and generator.

Hoist requires a truck bed area of only 18 x 23" for mounting, has lifting capacity of 1000 lb.

One man operates hoist by means of push-button switch on an 8' extension cord.

(Hoist-O-Matic is a product of Hoisters Inc., Dept. CP, 1913 Broadway, Kansas City, Missouri. Check CP 8603 opposite last page.)

# New Line of STAINLESS STEEL PAILS at Big Savings!



70

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New Welded Construction Equals Seamless or Spun

Entirely stainless (no solder) — smooth surfaces — sturdy 24 gauge type 304 analysis stainless — improved shape for easier carrying, better balance — handles, ears, chimes of heavy-duty stainless. Outstanding quality at lowest cost. Backed by Metalsmiths' 30 years' serving process industries.

SEND YOUR ORDER TODAY
PROMPT SHIPMENT

BIGGEST SELECTION
ON THE MARKET
10 qt. - \$ 9.25 ea.
12 qt. - 10.25 ea.
14 qt. - 11.25 ea.
16 qt. - 12.25 ea.
20 qt. - 13.50 ea.
24 qt. - 17.50 ea.
Discounts in quantity

LOWEST PRICES -

# METALSMITHS

Division of Orange Roller Bearing Co., Inc.

556 White Street Orange, N. J

When inquiring check CP 8604 opposite last page



When inquiring check CP 8605 opposite last page

CHEMICAL PROCESSING

Latest Product Development of ZONOLITE COMPANY

Here are a few ways Men in Industry Vermiculite

- · Fertilizer conditioner.
- Carrier of insecticides, herbicides, fungicides, fumigants.
- Cushioning material.
- Transportation of hot ingots.
- Insulation of liquid air storage vessels.
- Insulation of household appliances.
- High temperature insulating cements.
- Additive in paints, other products.
- ... and many more uses.

Zonolite's Vermiculite is the remarkable new vehicle that turns liquid chemicals into free flowing solids...has 27,500,000 particles per pound!



# Send for Free Booklet

ZONOLITE VERMICULITE HEMICAL AND PHYSICAL PROPERTIES"

#### OLITE COMPANY

135 So. LaSalle St., Chicago 3, Illinois

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When inquiring check CP 8606 opposite last page

Employ "thermos bottle" barges to haul liquid sulfur . . .

> inaugurate first commercial tow of liquid sulfur on the Mississippi River

New method of transporting large quantities of sulfur over long distance water routes was inaugurated recently at Port Sulfur, Louisiana, storage and shipping point for Freeport Sulfur Company's marshland mines. The molten sulfur will



be shipped to National Lead Company's Titanium Division plant at St. Louis, Missouri.

The molten sulfur is transported just as drawn from the mine in the liquid state, instead of the more familiar dry bulk form.

Foam-glass insulated tanks lie inside the barges. This serves to keep the heat away from the steel structure of the barge itself and also makes the barge less top-heavy and more seaworthy.

Barges are designed to maintain a constant temperature of 260°F but for cases of emergency, are provided with their own heating coils. They also have centrifugal pumps for unloading the hot liquid into storage tanks at points of delivery.

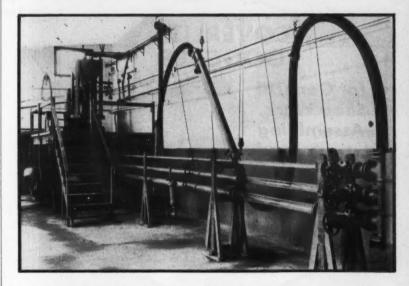
(Barges are operated by Coyle Lines, Inc., Dept. CP, Algiers Lane, New Orleans, La. . . . or for more information check CP 8607 opposite last page.)

#### Shows how to save old steel drums

Bulletin of four pages describes line of drum reconditioners. Equipment used to recondition drums employs airless mechanical method of hurling abrasives against walls.

Bul 113-D is issued by American Wheelabrator & Equip. Corp., Dept. CP, 1036 S. Byrkit St., Mishawaka, Ind. Specify CP 8608 opp. last page.

# **MORRIS Pump Performance** is <u>insured in advance</u> in this modern slurry laboratory!



The Morris equipment testing slurry shown here can determine friction losses and critical carrying velocities of any slurry. Customers' samples analyzed here have taken much of the guesswork out of slurry applications, and yielded such answers as these to actual pumping problems:

Proved that a job originally estimated at 200 HP could be done easily with 60 HP - because ANSWER of very low critical carrying velocity and unusually low friction loss.

Proved wide friction differences in very similar materials - saving the customer the time, ex-ANSWER pense and possible loss of an inadequate pump.

Proved that the customer could handle the job by gravity alone - and so required no pumping **ANSWER** equipment at all!

GOT A SLURRY PUMPING PROBLEM? For quick action, get in touch with the Morris engineers. The answers turned up by the Morris Slurry Laboratory may be just as pleasantly startling as any of the three above. If the pipeline is long, the Morris laboratory may give you the answer for minimum friction loss. A Morris-engineered installation is your best bet for economical, trouble-free service.



MORRIS MACHINE WORKS

Baldwinsville, N. Y. Sales Offices in Principal Cities

When inquiring check CP 8609 opposite last page

CESCO RIGHT... before your Eyes!

## COVERLITE GOGGLES

for General Shop Work, \* Assembling Inspecting



CESCO Coverlite Goggles are recommended for use where protection is regularly needed and where good visibility is important. They are large enough to be worn over all types of personal glasses with complete comfort. Replaceable Super-Safety lenses provide exceptional visibility and maximum protection.

Frames are one-piece injection-moulded plastic with adjustable headband.

#### No. 99 Approved CESCO Respirator

A twin cartridge organic vapor respirator (BM Approved) with positive acting inhale-exhale check valves which prevent rebreathing. High breathing efficiency. Easy to install new cartridges. Converts to No. 96 (BM Approved) CESCO Dust Respirator by changing cartridges to filter pads. Buy

one respirator with cartridges and filters for dual service.



**Aprons and Sleeves** 

CESCO Aprons and Sleeves are made of Acitex, a tough, flexible, lightweight material with high

resistance to acids, caustics, and splashing liquids. Withstands abrasion and strain in ordinary use. "Welded" seams eliminate all metals and stitching.

See your CESCO Safety Equipment Distributor or write for details





OFFICES 1N: Allanta, Birmingham, Boston, Buffalo, Cincinnati, Cleveland, Columbus, Dollas, Detroil, East Oronge, Hoeston, Indianopolis, Kamas City, Krasville, Little Bock, Los Angeles, Louvville, Mexico City D.T., Milwoukee, Montreat, Peerica, Philadeship, Pittibutyin, Soil Lake City, San Francisco, Spokane, St. Lovio, St. Poul, Toldos, Linko, Wichib

When inquiring check CP 8610 opposite last page

To promote safety and plant hygiene at 60 plants, the world's largest metal lithographer uses roving scientific crews as . . .

# ambassadors of safety

In addition to the regular plant safety department, American Can Company uses highly skilled safety personnel to implement its safety program

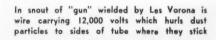
As the nation's leading manufacturer of metal containers Canco produces billions of soldered cans annually. Such a large volume could bring about lead absorption by employes who work near solder baths and conceivably could be a problem for the American Can Company, Solvent vapors are unavoidable during the printing process, and inhalation by employes could also be a problem. Yet, neither is a formidable health

This is in large measure due to the work of the company's Safety and Industrial Hygiene group operating from its ultra-modern laboratory at Newark, N. J. From this laboratory, two, or three-man crews are constantly on the move from plant to plant, checking ventilation, lighting, health practices, and

use of personal protective equipment. They use a station wagon loaded with scientific instruments for short trips, but ship equipment and travel by public transportation to distant plants.

They carry a bevy of instruments with them. These instruments include carbon monoxide indicator, light meter, sling psychrometer, potentiometer (for radiant heat measurement), sound-level meter, octave band analyzer, electrical ground tester, dust counter, etc. Besides these instruments they also use three special instruments for the bulk of their testing. These are the Velometer, Vapotester, and electrostatic precipitator. While many of the plants have testing equipment of their own, special research in-

Velometer being used by Nils Carlson measures movement of air under exhaust hoods in feet







AU



Collection of tubes contains samples of air. These tubes form the snout of the electrostatic precipitator. The dust in these tubes is subjected to delicate chemical tests to determine healthful working conditions, location by location

struments used by these work crews are more sensitive than those in use at individual plants.

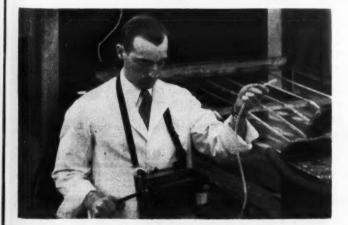
Velometers check air velocities or exhaust volumes of ventilation control equipment. Canco allows minimum air movements of 1500 linear fpm to draw off fumes from down-draft exhausted solder baths. At solder wipe units it is 300 for control of dust and fumes and 1500 for control of large solder particles. Various enamel and lacquer spray units require minimum movement of 1200 fpm.

Vapotesters check concentration of vapor solvent in air. This is an extremely complicated series of tests since Canco uses more than 1000 different combinations of solvents in lithographing tin plate and coating it with enamels and lacquers.

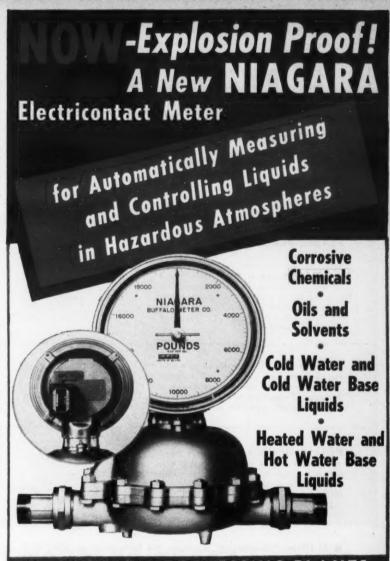
Electrostatic precipitator gathers all types of dust in the air — including grindings, buffings, sand blastings, coal, soot, dust from glues, and compound mixing — and deposits them on inner surface of sample collection tube. Air flows through tube at a constant rate of speed and dust particles are charged as they pass a center wire which has a potential of 12,000 to 16,000 volts. Inner surface of tube is of opposite polarity so particles adhere. At Newark tubes are carefully washed and contents analyzed.

After their testing is over, safety crew returns to Newark to complete laboratory and analytical work. When this is completed a detailed confidential report is made and forwarded to plant manager and Canco's division company official. Report is or-

(Continued on page 123)



Davis Vapotester measures solvent fumes in air. Inside box strapped to Allen Guy is a hot electrical wire which burns hotter or cooler in proportion to amounts of solvents present. Degree of hotness increases conductivity of wire which is measured on meter



#### For CHEMICAL PROCESSING PLANTS

Shuts solenoid valve or stops pump motor after preset gallonage has flowed through the meter. Opens or closes circuit to actuate any electrical controls. Provides automatic shut-off for batch measurements. Insures accuracy. Saves time. Increases production without increasing man-power requirements, Wide range of sizes and capacities of both Meters and Electricontact Registers.

Design incorporates Model EX-AR Microswitch which carries Underwriter's Laboratories listing for use in hazardous atmospheres, Class 1, Group C and D and Class 2, Group F and G. Electricontact register has new

improved heavy duty construction. Used on 110 to 550 V. a.c.

Brings automation to liquid volume measurement and control even in hazardous atmospheres.

> For Complete Details Write for Bulletin 35

#### BUFFALO METER CO.

2892 MAIN STREET BUFFALO, N. Y.

Representatives in all leading industrial centers

When inquiring check CP 8611 opposite last page

NG

# Let DINGS help you select the MAGNETIC SEPARATOR that will best meet your specific requirements

PERMA-PLATES — Install in chutes or spouts or above belts. Use Type IA when depth of material does not exceed 2½"; Type 2A for burden depths to 3½"; Type 3 for burden depths to 4". Available with two poles for standard service and four poles for maximum protection on difficult jobs. All sizes. The lowest cost answer to tramp iron removal problems!



PERMA-PULLEYS — Install as a nonelectric head drive pulley in belt conveyor systems. Completely automatic removal and discharge of iron. Extremely powerful. Meets all requirements. Complete range of sizes.



PERMA-DRUMS — Install bare drums at the discharge of spouts or chutes; fully enclosed models can be installed in closed chutes for completely dust tight installations. Highest grade Alnico. More powerful than old electro-drums. Fully automatic removal and discharge of iron.



• At Dings, "job-selecting" a magnet can be done on an ideal basis because Dings, and only Dings, offers these three things: (1) the widest line of types and sizes available; (2) unsurpassed quality of materials and magnetic engineering; (3) OVER 50 YEARS' EXPERIENCE IN THE DESIGN, MANUFACTURE AND APPLICATION OF EVERY CONCEIVABLE TYPE OF MAGNETIC SEPARATOR. Whatever your magnetic separation problem, these are the advantages you get when you buy a Dings "Job-Selected" magnet.



#### DINGS MAGNETIC SEPARATOR CO. 4731 W. ELECTRIC AVE.

MILWAUKEE 46, WIS.

AD155-2/3

MAIL THIS COUPON TODAY

4731 W. Electric Ave. Milwaukee 46, Wis.	
Please send copy of	Catalog C-5000-B.
Name	Title
Company	
Address	

When inquiring check CP 8612 opposite last page

#### SAFETY

# Combine neoprene, Dacron in rugged fire hose

Uses: To meet requirements of oil industry and chemical plants where oil, chemicals, rough use and mildew demand long-wearing hose.

Features: Hose is oil-resistant, impervious to mildew, provides maximum resistance to abrasion, acids, alkalis, and oxidizing agents.

Description: Tube of hose is constructed of oil-resistant neoprene and is covered by strands of 100% Dacron yarn, which in turn is impregnated with a coat of neoprene.

Test pressure for hose on delivery is 500 psi per 50-foot length. It is available in two sizes, 1½ and 2½ inch diameters.

(Tuff-Weave hose is available from Fyr-Fyter Company, Dept. CP, 221 Crane St., Dayton 1, Ohio . . . or for more information check CP 8613 on handy form which is located opposite last page.)

# Forged non-sparking tools replace cast models . . .

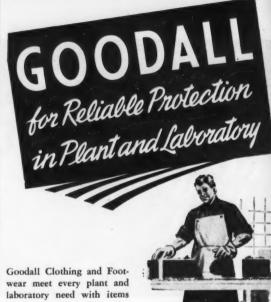
beryllium copper safety wrenches are lighter, stronger

Uses: For maintenance use in hazardous locations where accidental sparks might result in fire or explosion.

Features: Forged wrenches are 46% lighter than cast models while slimmer and stronger. Section thickness — as well as torque values — are on a par with high-grade steel tools.

Description: Open-end wrenches are first of a series of non-sparking tools now in production. They are available in various combinations of opening sizes from 7/16 x ½" to 1 1/6 x 1½". Forged product is 46% lighter than comparable cast models.

(Wrenches are a product of the Beryllium Corp., Dept. CP, Tuckerton Rd., Reading, Pa. . . . or for more information check CP 8614 opposite last page.)



wear meet every plant and laboratory need with items of long-established quality and value. Practical design, selected materials and careful manufacture assure the utmost in protection, comfort and durability.

#### COATS • APRONS • OVERALLS

Available in rubber, rubber latex and neoprene latex, in a wide range of styles and sizes. Carefully tailored to provide fine appearance, maximum comfort and long wear.



#### "GOODSEAL" All-Purpose Gloves

re

Made of a special compound that is impervious to the actions of oil, acids, alkalies, animal fats and most other solids and solutions. Smooth, flexible, easy to wear. Highly resistant to snagging and puncturing. Extra-grip finish on finger tips.

#### **BOOTS** • SHOES • RUBBERS

Rubber and Neoprene Boots, and Lace Work Shoes, with or without "Toe-Saver" (R) Safety Toe. Slip-resistant soles. White Dairy Boots, 10" high. Best quality Work Rubbers, net lined.



**Contact Our Nearest Branch for Details and Prices** 



When inquiring check CP 8615 opposite last page

CHEMICAL PROCESSING

#### SAFETY PROGRAM

(Continued from page 121)

ganized by departments in the factory so that each foreman may review that portion of the report which interests him.

Following detailed discussion of each department, recommendations for reducing exposures or improving conditions noted are listed. All recommendations are summarized at front of the report for management of plant level and higher.

On the basis of recommendations made in the report, plant manager causes required changes of improve-



Staff of Safety and Industrial Hygiene group with Supervisor, Elgin Sallee, (left) in office of Robert Miller who oversees laboratory

ments to be made. Follow-ups are made by plant manager, division and/or company officials, division health and safety supervisor and by later detailed safety and industrial hygiene surveys.

Besides the valuable work of plant-to-plant checking, the Newark laboratory performs another safety function. It tests all new materials to be used, including everything from lacquers, solvents, and thinners, to washing powders and soaps. No new item may be used in any plant, regardless of the need for it, until laboratory has given approval.

(Information for this article was furnished by the American Can Company, Dept. CP, 100 Park Avenue, New York, New York.)

## Offers quick-test device for ammonia leaks

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Pocket-size device for detecting ammonia leaks is available without cost to ammonia users.

Device is a booklet containing paper strips impregnated with phenophthalein. By tearing strip from book, saturating it with water and holding it near suspected leaks, user can detect presence of ammonia when color of paper turns red.

Testing paper booklet is issued by Nitrogen Div., Allied Chemical & Dye Corp., Dept. CP, 40 Rector St., New York 6, N.Y. When inquiring specify CP 8617 on handy form opposite last page.



#### WHAT HAPPENS NEXT?

If management has been wise, a fire tragedy will be stopped before it starts...if not, in 20 minutes extensive destruction and total loss could readily be the result.

First-rate fire protection is essential to the continued success of any business. With C-O-TWO Smoke or Heat Fire Detecting Systems, plus C-O-TWO High Pressure or Low Pressure Carbon Dioxide Type Fire Extinguishing Systems, as well as PYRENE Air Foam Type Fire Extinguishing Systems for specific outdoor locations, your plant can have fast, positive round-the-clock fire watchman service simultaneously at each fire hazard point . . . a fire tragedy is stopped before it starts.

Furthermore, there is a personal sense of responsibility inherent with PYRENE—C-O-TWO Fire Protection Engineers that assures you of fully adequate firesafety . . . a definite plus in your behalf. Whether it's fire detecting or fire extinguishing . . . portables or built-in systems . . . PYRENE—C-O-TWO means top quality backed by experienced engineering that results in operating superiority for you at all times.

Act now...don't take unnecessary chances with your investment any longer...the extensive experience of PYRENE—C-O-TWO over the years is at your disposal without obligation. Remember...a plant-wide fire protection survey skillfully executed today could be the means for greater profits tomorrow.



#### PYRENE - C-O-TWO

NEWARK 1 . NEW JERSEY

Sales and Service in the Principal Cities of United States and Canada



#### COMPLETE FIRE PROTECTION

portable fire extinguishers . . . built-in fire detecting and fire extinguishing systems

CARBON DIOXIDE . DRY CHEMICAL . VAPORIZING LIQUID . SODA-ACID . WATER . CHEMICAL FOAM . AIR FOAM

When inquiring check CP 8618 opposite last page

Steel-Grip constantly keeps abreast of developments in chemical processing, for their effect on the safety of chemical workers. And we as constantly develop new materials and new designs to counter these risks. Some of the latest Steel-Grip designs are shown on this page; they have proved extremely effective wherever they have been used.

We also believe it important to you that Steel-Grip has been designing and manufacturing a broad line of safety apparel since 1910. This has given us an enviable entree into hundreds of the largest plants of every type-an experience of untold value to any buyer or user of safety apparel. We have always emphasized quality because in our experience it gives the greatest satisfaction and value and always works out at the lowest man-hour cost of protection. Quality manufacture is standard practice here. As a result, our prices are frequently no higher than for inferior merchandise.

We manufacture a complete line of safety apparel to meet every type of need. We suggest you send for our catalog and at the same time tell us your specific





#### DYNEL CLOTHING

Steel-Grip makes a line of coats, pants, shirts, laboratory coats from Dynel cloth, known to be resistant to a wide range of chemicals. Good-looking, neat, long-wearing. Will withstand many, many launderings. Special designs to



Steel-Grip manufactures a complete line of safety apparel from Jaxcolite, Dynel, Leather, Duck, Wool, Asbestos, Perma-Proof, Aluminumcoated materials, etc. for every possible safety need. No matter what you require, contact Steel-Grip Industrial. Write for catalog today.

#### When inquiring check CP 8619 opposite last page

#### Diesel engine in lift trucks provides safe handling

Diesel fork lift trucks in 3000 to 7500-pound capacities have been developed for use in areas where ordinary non-protected trucks are prohibited.

These fork lift trucks are equipped with Diesel engines, hydraulic starters, water muffler and mani-



Diesel truck handling load of phenolic at Plastics Engineering Co., Sheboygan, Wisc.

fold, and mechanical gages. They also have static conductor tires, non-ferrous forks and foot gong. Outstanding feature of trucks is use of Diesel engine. Diesel engine requires no electric ignition system — use of hydraulic starter instead of electric starter makes possible a lift truck without electrical wiring. This eliminates possibility of electric sparks.

By using water cooled exhaust manifold and water manifold, exhaust sparks can be quenched, hot metal surfaces avoided and temperatures kept below 200°F, which is considered safe in a majority of hazardous operations.

Complete line of diesel trucks is acceptable by Mill Mutual Fire Protection Com-

Engine compartment, showing hydraulic starter, lever and accumulator

pany for use in its insured locations, without penalty in rate. This will permit safe operation in Class II, Group G areas.

Combustion chamber in the Buda Diesel Engine assures complete combustion of the fuel, and eliminates smoke and objectionable odors. Carbon monoxide, the result of incomplete combustion, has been eliminated by this compression ignition type engine.

Hydraulic starting motor is operated by driver from his position on truck by releasing a mechanical lever. Energy for starter is stored in a hydraulic accumulator, which maintains its pressure reserve by normal operation of truck's hydraulic tilt control. To discharge cylinder for repair, or if pressure escapes through a leak in the system, manually operated pump is furnished to recharge accumulator.

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Electrical equipment on engine most likely to cause an accident from a spark standpoint has been eliminated. Also electrical fuel gage, electric oil pressure gage, electric horn, etc, have been replaced with mechanically operated mechanisms.

These trucks have found application in plastic and chemical plants, refineries, flour mills, cotton and paper handling installations, as well as in underground operations.

(Diesel trucks are a product of the Allis Chalmers Mfg. Co., Buda Division, Dept. CP, Harvey, Ill. Check CP 8620 opposite last page.)

# Piped system of fire extinguishing employs dry chemical . . .

provides against Class B and Class C fire hazards at industrial plants

Underwriters Laboratories, Inc. has granted approval to dry chemical piped system of fire extinguishing. With this system, automatic fire protection is provided against Class B and Class C fire hazards by means of dry chemical, which is conveyed through pipes and expelled in area surrounding hazard.

Applications for this system will be in the hazardous areas such as paint dip tanks and spray booths, ovens, driers, oil quench tanks, flammable liquid pumping stations, transformer vaults, oil storage tanks, flammable liquid storage rooms, asphalt saturators and generators.

Doors, windows, ventilation ducts, operating valves, etc. can be closed automatically by the system's nitrogen pressure. An electric switch energized when system operates turns off fans and machinery and sounds alarms throughout the plant and in central fire alarm headquarters.

By using automatic selector valves, one piped system can protect two or more separate hazards. Dry chemicals flow only into piping that leads to fire area involved.

(This system is the development of the Ansul Chemical Company, Dept. CP, Marinette, Wisconsin. Check CP 8621 opposite last page.)

# Simplify Stock Problems with the AO<sup>†</sup> R5000 RESPIRATOR\*

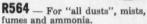
This ingenious twin cartridge respirator converts to many types of protection quickly merely by interchanging filters and cartridges. Ask your nearest & Safety Products Representative. It's complete protection in one "package"!





R562 — For "all dusts", mists, fumes and acid gases.









R561 — For heavy duty protection against highly toxic insecticides such as Systox, Parathion, Aldrin, Dieldrin, Chlordane, EPN, Nicotine, TEPP and HETP. Respirator protects against all dusts, mists, metal fumes and organic vapors. Approved by U. S. Dept. of Agriculture.



R50 — For combination of all dusts, not significantly more toxic than lead. B.M.2156



R50A—used with R50, converts to a dust and mist respirator. Protects against all dusts not significantly more toxic than lead, pneumoconiosis-producing mists, chromic acid mists. B.M. 2156 includes B.M. 2156A



R51 — For light organic vapors and gases of paint spraying, degreasing, dry cleaning, B.M.2304



R52 — For acid gases, and mists of plating operations, pickling tanks, etc.



R53—For combined acid and organic gases like carbon tetrachloride and acetic acid.



R54 — For protection against low or nuisance concentrations of ammonia.



R55 — For those who are exposed to both organic vapors and all dusts not significantly more toxic than lead. B.M.2305



R56 — For fumes produced in welding, burning, smelting and refining. B.M.2163



R57 — For dusts, mists, fumes, significantly more toxic than lead including radioactive particulate matter.



\*One Face Piece Takes
13 Sets of Filters
and Cartridges

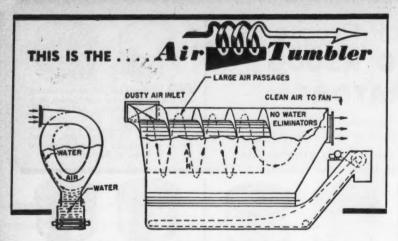
†T.M. Reg. by American Optical Company



SOUTHBRIDGE, MASSACHUSETTS . BRANCHES IN PRINCIPAL CITIES

When inquiring check CP 8622 opposite last page

NG



the master of DUST in industry \* \*

SIMPLE—DEPENDABLE
NO FIRE HAZARD
HIGH EFFICIENCY
CONSTANT CAPACITY
LOW OPERATING COST

Write for Bulletin No. 531. Address:

#### **DUST SUPPRESSION & ENGINEERING COMPANY**

P. O. BOX 67, LAKE ORION, MICHIGAN

Agents in all principal U.S. cities

When inquiring check CP 8623 opposite last page

# BRIDGE THE "DANGER PERIOD." HAWS EYE-WASH FOUNTAINS

Even though summoned medical aid arrives as rapidly as possible, time elapsing between occurence of eye accidents and a physician's care is too often the period when permanent harm is done.

Bridge this "danger period" with HAWS Emergency Eye-



anger period" with HAWS Emergency Eye-Wash Fountains that permit injured workers instantaneously to wash injurious matter from their eyes with clear water at safe controlled pressure.

Available with HAWS Drench Shower Attachment to form an "emergency first aid station" for your employees' protection. All HAWS Safety Equipment is designed and manufactured in cooperation with leading safety engineers.



Write for full details today!



1439 FOURTH STREET (Since 1909) BERKELEY 10, CALIF.

When inquiring check CP 8624 opposite last page

#### SAFETY

Cover converts used drums to fire prevention cans . . .

drum cover can be used on 55-gal, 30-gal, or standard corrugated trash can

Uses: For converting 55-gal or 30-gal steel drums, or standard corrugated trash can into recaptacle for oily rags, clothing, paints, solvents, waste paper, etc.

Features: To convert unit to fire prevention container, it is necessary only to place strap around



Drum cover with fusible link converts used drums into handy fire prevention container

upper part of drum with cover closed for quick positioning and then tighten single wing nut.

Description: Drum cover, painted red, is sturdy steel stamping which fits firmly over edge of cover or can. It has specially designed hinge incorporating spring plunger which attaches cover to steel strap.

Normally, cover stands open for receiving waste materials and is held in this position by spring plunger unit containing low-melting-point fusible link. Unit projects slightly over body of drum and should fire occur within drum, fusible link melts, releasing spring-loaded plunger to close cover and prevent further damage.

(Thermo-acting drum cover is a product of the Protecto-seal Co., Dept. CP, 1920 S. Western Ave., Chicago 8, Illinois . . . or for more information reader may simply check CP 8625 on the convenient Reader Service slip which is located opposite the last page.)



# **Protective Clothing**

by Sawyer

Wears like iron — takes endless rubbing, scraping, snagging, and still gives full

100% Waterproof — made with top quality base fabric saturation-coated first and then coated with 6 coats of Neoprene Later.

Positively will not blister, crack or peel. Its longer lasting quality means greater economy.

Also: Three-quarter and long coats, aprons, coveralls and many other styles. All clothing made in black or yellow.



Cambridge, Massachusetts

When inquiring check CP 8626 opposite last page

CHEMICAL PROCESSING

SAFETY

kit contains 2 cylinders, 2 masks, flow regulator

Lightweight and compact, portable oxygen unit is especially valuable in emergencies.

Unit includes 2 standard "B" medical oxygen cylinders, flow regulator with gage that gives range of 3 to 7 liter flow of oxy-



Portable oxygen kit

gen per minute and 2 disposable masks. Unit also includes carrying case. Overall weight is only 17 pounds.

(Pocketaire Oxygen Unit is a product of The Cycle-Flo Co., Dept. CP, Milford, Conn. Check CP 8628A opposite last page.)

# Dust mask weighs 1/2 oz, fits any face

Protective face mask weighing less than ½ ounce has been developed for protection against ordinary non-toxic dust and spray hazards. It may be worn with goggles and fits any shape face.

Construction is of soft-rolled aluminum but no part of metal touches the skin. Unit uses long staple cotton bonded filter to keep out dust.

(Mask 48A is a product of General Scientific Equipment Co., Dept. CP, 2700 W. Huntingdon St., Philadelphia 32, Pa. Check CP 8629 opposite last page.)



# ACME . the Only Gas Mask With the "PICTURE WINDOWS"

You never have that "jammed-in" feeling, wearing the Acme Full-Vision Gas Mask. Its patented, larger lenses are like picture windows, giving you full natural vision for that safe, unconfined feeling. When you walk, you can actually see your toes without bobbing your head. This factor alone makes Acme outstanding among gas masks . . . well worth looking into.

Write for the complete story on Acme Gas Masks for the chemical industry. Ask for the exclusive Acme Protection Guide listing the protection against 433 hazards.

#### ACME PROTECTION EQUIPMENT CO.

1219 Kalamazoo Street, South Haven, Michigan

When inquiring check CP 8627 opposite last page



the new basic material, all in one plece (including channels), not welded, riveted or expanded in steel or aluminum, in standard sizes and gauges. Safety GRIP-STRUP presents an open space, in a diamond pattern, in excess of 55% of the area for ready access of light and air and gives a positive NON-SKIP footing in all directions. Ideal for work platforms, stair and ladder steps, flooring, balconies, catwalks, machinery guards, fire escapes and for original equipment safety treads.

**Important Safety Features** 

- ★ Fire proof
- Slip proof
- ★ Minimum weight ★ Easy to stand on
- \* Cool in summer warm in winter

#### **Big Economy Features**

- ★ For balconies no extra light needed below — no extra heat.
- ★ No secondary sprinkler heads needed
   ★ Self-cleaning
- No extra supports necessary — channels are inte-
- ★ Cut and installed like lumber by your own maintenance force
- ★ Low in original cost

  Distributors in all principal cities. Consult yellow pages
  in phone book under "GRATING."

## GRIP-STRUT division

4006 S. PRINCETON AVE. . CHICAGO 9, ILL.

When inquiring check CP 8628 opposite last page

The Hazard of Being Half Safe

ny plant addition in which "Automatic" Sprinklers have not been extended is a weak link in the chain of protection. It's a critical area in which fire may cause considerable property damage and complete disruption of business continuity. Once out of control, fire in an unprotected section might possibly lead to complete destruction of property, even though other building areas are protected.

You can't afford to be half safe. Install

#### ENGINEERED Automatic Sprinkler PROTECTION

throughout all buildings susceptible to fire. Being 100% protected 100% of the time is good business. And—it's well to remember—what's worth insuring is worth protecting!



Offices in Principal Cities of North and South America

When inquiring check CP 8630 opposite last page

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YOU WANT MAXIMUM RESISTANCE TO CHEMICALS, WEAR AND LAUNDERING IN WORK CLOTHES

GET IT FOR LESS WITH

DYNEL

THE FIBER THAT FIGURES IN YOUR FUTURE

Tests prove that shirts, pants, coveralls and lab aprons made of 100% DYNEL fiber last four or five times longer than comparable garments made with traditional fibers. DYNEL is unaffected by most chemicals, can be cleaned or decontaminated in acids — without harm; will not support combustion. It is washable, retains strength wet or dry, dries quickly YES, IT FIGURES. You save because you get more for your money in 100% DYNEL work clothing. It's so long wearing that many laundries specify it for industrial rental clothing. To find out how much DYNEL can save in your operation, write us today Dept. C.

Textile Fibers Department, Carbide and Carbon Chemicals Company
A Division of Union Carbide and Carbon Corporation

114 30 East 42nd Street. New York 17 N Y

When inquiring check CP 8631 opposite last page

SAFETY



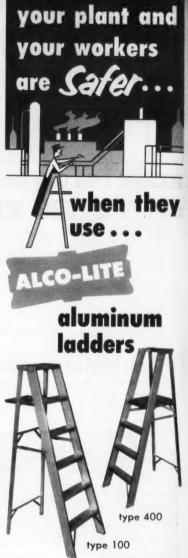
#### CHEMICAL PROCESSING gets National Safety Council public interest award

On July 7th, the National Safety Council made formal presentation of its 1954 Public Interest Award to CHEMICAL PROCESSING. The Award was presented in recognition of the articles CP published last year which described ways and means of improving safety in the chemical processing industries.

Below, F. A. Van Atta, right, Staff Representative of the Chemical Section of the National Safety Council, presents Award to Dick Callahan, Assistant Editor in charge of CP's monthly "Safety" section. Russell L. Putman, President of Putman Publishing Company, Publisher of CHEMICAL PROCESSING, looks on at left.







They're non-sparking and stronger!

These rugged ALCO-LITE Ladders are made of industrial type aluminum alloy. They are completely non-sparking and safe to use around highly inflammable materials. They can't rust, rot, splinter or burn. They're so easy to lift and handle, yet are much stronger than any wood ladder Each step is corrugated for safety and riveted to the side channels with a total of eight rivets. ALCO-LITE Ladders more than meet ASA and Metal Ladders Association standards.

for more information and your copy of NEW General Catalog write to Dept. A6

original manufacturer of aluminum ladders

ALUMINUM LADDER CO. WORTHINGTON, PA.

When inquiring check CP 8632 opposite last page



Treen manufactured 5-6½- and 13 gallon carboy boxes are quality built in accordance with ICC regulations, with features that give all-point protection; reducing haxards and breakage, ease in handling and compact loading.

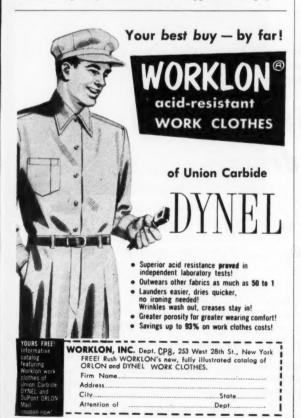
WRITE FOR COMPLETE DATA

# TREEN BOX COMPANY

TIOGA AND MEMPHIS STS., PHILADELPHIA 34

"Aces in Cases" for over 50 years

When inquiring check CP 8633 opposite last page



When inquiring check CP 8634 opposite last page

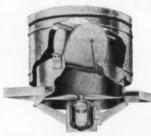
# Allows roof ventilator to act as vent

Thermally actuated emergency damper opener is designed for power roof ventilators.

It allows ventilator to act as venting device for smoke, heat, and fumes in event of fire.

Consisting of twin high-torsion alloy steel springs mounted on telescoping steel tube support, the unit is completely independent electrical equipment.

There are no motors, thermostats, wiring, or counterweights. Two steel spring arms are held in place



Fusible link allows ventilator to operate as damper in case of fire

by fusible link. These arms open dampers, providing an unobstructed escape route for smoke and fumes. It is available in two sizes for roof ventilators from 24" to 60" in diameter. Wide range of temperature ratings is available. These ratings range from 135 to 360°F.

(Damper opener is a product of Propellair Div., Robbins & Myers, Inc., Dept. CP, Springfield, Ohio. Check CP 8635 opposite last page.)

# Tells of applications for wire rope

Overhead cable conveyor system, automatic safety device for scaffolds, logging operations, handling bar stock, and well digging applications for wire rope are described in bulletin.

"Ropeology is available from Macwhyte Co., Dept. CP, 2940 Fourteenth Ave., Kenosha, Wis. When inquiring specify CP 8636 opposite last page.



When inquiring check CP 8637 opposite last page

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# Speed production labeling, save time and money with Avery pressure-sensitive Labels...

"-and what a <u>difference</u>
they make!" For production line work, or one-at-atime labeling jobs - wherever you need to code, identify or label...in shipping or warehousing - in engineering, inspection or research - in maintenance or management . . . Avery Labels can save you time and money - can simplify and speed your work. That's why Avery pressure-sensitive Labeling is different...practical and economical! Avery's new dispensers - either manual or electric - are available to make your labeling even more efficient...to speed every type of labeling job - whether it's a single item or a thousand. Avery Labels are applied dry and fed, one or more at a time, ready for instant application. There's no sorting of loose labels...no messy glueing or licking... no soiled, spoiled packages.

> FAST, SIMPLE, AUTOMATIC LABELING WITH NEW AVERY '55 ELECTRIC DISPENSER.

> > Individually die-cut labels are automatically fed from rolls. As fast as one label is used, another pops out. Ask now for a demonstration ... there's no obligation.

BCF1	M-KLEEN
	en you want
	EMOVABLE
lab	
4410	E1.

PERMA-GRIP when you want a PERMANENT label.

Write now for details— Free sample labels and case histories!

Kum Kleen

Send me free samples and information on Avery Pressure-Sensitive Labels.
--

- l'd like to know more about the new "55" dispenser.
- Please have the Avery man call.

				3		
AVERY	ADHESIVE	LABEL	CORP.,	Custom	Div.	123
1616 S.	California	Ave., I	Monrovia	. Calif.		
117 Lib	erty Street,	New 1	ork 6	1		

name		
address		
city	state	

When inquiring check CP 8638 opposite last page

#### packaging



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AUG

Finished steel drum striking lithographed colors in red and black, and an epoxy-phenolic liner make this an attractive, highly functional container

A container manufacturer on a quest found an answer in epoxy-phenolic linings which permit him to

# ship active chemicals in steel drums

Linings are easy to apply, stay on despite rough handling, give excellent resistance to chemicals

Problem: To the steel drum manufacturer, plastic interior linings have posed a big question: which lining would resist most chemicals, be easy to apply, and stay applied despite rough handling? Conventional linings available didn't meet all three specifications, so one manufacturer of steel shipping containers set out to find a lining that would.

One group of coatings tested were easily

applied, adhered well, and resisted mechanical abuse; however, only the mildest of acids and alkalis and a few solvents could be shipped. Another group had high solvent resistance, but were difficult to apply satisfactorily. Their adhesion to steel was poor, and their resistance to impact was too low to permit normal handling without cracking or chipping.

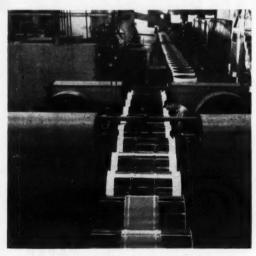
Solution: After many formulations were tested with varying degrees of success, the drum manufacturer found his answer in a series of epoxy-phenolic coatings. These combine all the desired properties and bridge the gap between linings that are easy to apply and those offering high solvent resistance.

Also, the manufacturer was particularly satisfied because the formulations can be roller-coated onto flat steel sheets. Linings are not harmed by the rolling, hoop-forming, and swaging operations that follow. This results in considerable savings in cost of the coating process.

Of course, the plastic-lined drums are smooth and permit product identification to be lithographed in bright colors for added sales appeal.

Results: Exhaustive tests have proved that many products which formerly required stainless steel drums or glass carboys may now be safely packaged, shipped, and stored for six months or more in epoxy-phenolic-lined carbon-steel drums. Among the chemicals which may be handled this way are alkalis, detergents, dilute mineral acids, chlorinated solvents, formaldehyde (formalin), detergents combined with hydrocarbon solvents, and fatty acids.

Tests currently under way give promise of developing other linings in this epoxy-phenolic series which



Drum linings are not harmed by rugged fabricating steps such as flaring or flanges and forming of hoops, shown here

will extend the range of container protection to more highly corrosive chemicals.

(Epon\* resins used in the epoxy-phenolic linings are products of Shell Chemical Corp., Dept. CP, 50 W. 50th St., New York 20, N. Y. . . . or for more information check CP 8639 on handy form opposite last page.)

(Plastic-lined steel drums are products of Rheem Manufacturing Company, Dept. CP, 4361 Firestone Blvd., South Gate, Calif. . . . or for more information reader may simply check CP 8639A which is located opposite last page.)

\*T.M., Shell Chemical Corp.



# Here's why you can't beat

# **CONTINENTAL Fibre Drums**









Lightweight, sturdy packaging plus service-that's what you get when you buy Continental fibre drums. We make available expert engineering facilities, and you have your choice of more than 60 sizes, 17 colors, 16 inks. For safe shipment, you can't beat Continental fibre drums. For packaging advice, you can't beat Continental service. Why not call on us soon?

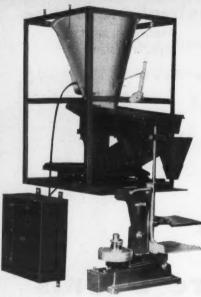


New York . Philadelphia . Pittsburgh San Francisco • Los Angeles • Eau Claire • II



When inquiring check CP 8640 opposite last page

G



# High-Speed, Semi-Automatic Weighing, Bagging Machine

This machine gives you fast, accurate bagging, packaging, boxing of any free flowing material. Saves time, saves product by eliminating overweights.

"Vibra-Flow" feeder is controlled by photo-electric cell that reduces speed of flow from bulk fill to trickle feed for exact cut off.

MODEL 1001-FM-2-30 weighing machine is recommended for packages up to 25 lbs — hopper capacity 18 cu. ft.

Write for complete details on Exact Weight weighing machines.

Exact Weight

Better quality control

Analog

Service Coast Better quality contr

Sales and

to Coast

Better cost control

THE EXACT WEIGHT SCALE COMPANY

905 W. Fifth Avenue, Columbus 8, Ohio In Canada: P.O. Box 179, Station S, Toronto 18, Ont.

When inquiring check CP 8641 opposite last page

# Automated



LIQUID compounding packaging accounting

Blends two or more liquids in preset proportions, automatically, in closed, continuous production. Highest possible accuracy. May be integrated with packaging and accounting for automated production. Write for "BLENDING" folder.







Repeating dial delivers predetermined, repeating quantities automatically.

Predetermining dial delivers quantities up to 10,000 gallons, then shuts off. Recording printer on meter prints quantity dispensed or received for accounting.

BONSER R

BOWSER, INC., FORT WAYNE, IND.

1315 E. CREIGHTON AVE.

When inquiring check CP 8642 opposite last page

#### PACKAGING

#### Glue pot mess ended by adhesive that sprays on

The messy glue pot with its brush or stick applicator may soon become a thing of the past, thanks to successful packaging of a rubber-resin adhesive in a push-button spray container.

Fast-drying and effective over a wide temperature range, adhesive can be used on surfaces like fabrics, leather, paper, wood, rubber, and smooth metal.

An 11-ounce container of the spray material contains enough adhesive to coat approximately 250 sq ft of surface. Advantage of product is its ease of application.

Dispensing pressure in the pushbutton product is provided by Freon fluorinated hydrocarbon propellent, a product of Du Pont. (Bonad Spray Adhesive is a prod-

(Bonad Spray Adhesive is a product of Walsh Adhesive Corporation, Dept. CP, 2024 Peel Street, Montreal, Quebec, Canada.)

## Mineral acid shipment no longer a problem

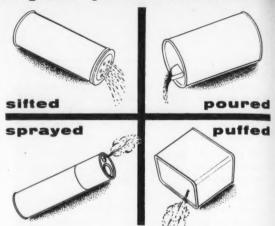
Designed primarily for the chemical industry, where shipping mineral acids has been a problem, 28 and 38 mm closures have polystyrene cap with a polyethylene liner. Cone-shaped liner resists acid attack and eliminates backoff, binding and leakage.



Also available are molded, onepiece polyethylene liner-applicators, with or without brush.

(Poly-Ethy-Lined closures and liner-applicators are products of Poly-Seal Corp., Dept. CP, 405 Lexington Ave., New York 17, N.Y. . . . or for more information check CP 8643 opposite last page.)

#### if your product can be



... check the greater flexibility and economy of R. C. FIBER CONTAINERS

Square • Round • Oval • Oblong Shapes...all Sizes • Spout Sifter • Slip • Screw • Dredge and Friction Closures

Write for further details today



When inquiring check CP 8644 opposite last page



Left— Union Special Style 20100 H Bag Closing Machine

Here's how to close MULTIWALL PAPER BAGS

FOR lower production costs
...stronger, neater closures
...ability to get out rush orders
in a hurry, you can't beat Union

Special Bag Closing Machines! Specially built to stand up under heavy production schedules, these machines provide the high output rates needed to meet modern competitive conditions.

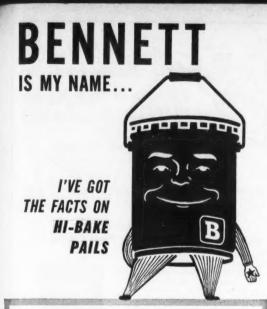
In the Union Special line, it's easy to find the right unit to meet your particular requirements, ASK FOR RECOMMENDATIONS.



Get your copy of this 16 page illustrated bulletin containing helpful data and charts on the complete Union Special line of bag closing machines. UNION SPECIAL MACHINE CO., 442 North Franklin Street, Chicago 10, Illinois

UNION SPECIAL

When inquiring check CP 8645 opposite last page



There's a world of difference between Bennett Protected and ordinary hi-bake lined pails. It's the way they are made that counts.

PAIL EARS ... Bennett projection welded ears eliminate rivet crevices, a common point of failure in ordinary hi-bake pails.

SIDE SEAM . . . Bennett pails have the smoothest side seam in the industry. Free from heavy overlap and weld spatter.

BOTTOM CHIME . . . Bennett Hi-Bake Linings go all the way through the bottom seam or chime.

BAKING CONTROL . . . The crux of all hi-bake linings. Bennett has the latest type ovens with tolerance limits that insure a perfect product.

THOROUGH INSPECTION . . . Bennett gives your product double protection . . .



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- FIRST with carefully inspected, correctly applied hi-bake linings.

SECOND with pretested containers and superior workmanship, the result of over 40 years of experience in steel container manufac-

Call Bennett today for help on the type of hi-bake lined pail best for your specific product. We supply lined pails for your own tests without obligation.

# BENNETT INDUSTRIES

Peotone, Illinois

40 MILES SOUTH OF CHICAGO LOOP ON ROUTE U. S. 54

BENNETT PAILS ARE DISTRIBUTED BY

BENNETT PAILS ARE DISTRIBUTED BY
Langer, First A., Lensen, Atlanta, Geo. E., Missabach & Co.; Butfalo, R. C. Gerber,
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San Francisco, A. J. Lynch & Co.; Seattle, Carl F., Miller & Co.; Spokane,
son & Smith; Boston, The Truesdale Co.

When inquiring check CP 8646 opposite last page AUGUST, 1955

Using plastic-film liners? here are some tips that prevent trouble

Correct Size - Never buy too short or too narrow a liner so that material must be stretched to fit container.

Absolute seal - Important fact to remember is that seal must not have skipped spaces, cannot be pulled apart, and has as little extruded "leading edge" on either side of seal as possible (this can weaken liner and seal by as much as 50%).

Lightweight films - A film that is too light in gage to hold the contents of a package efficiently and safely is a waste of money. The following table is a good general reference to correct thickness (gage or mil) of polyethylene to use:

Nonhydroscopic powders and solids - 0.0015 or 0.002 gage

Pastes, viscous liquids, loose gels - 0.0025 or 0.003 gage

Hydroscopic powders, solids, gels - 0.0025 or 0.003 gage

Liquids, foods, very hydroscopic powders — 0.004, 0.005 or 0.006 gage

(Information courtesy of plasticfilm maker, Protective Lining Corp., Dept. CP, 22 Woodhull St., Brooklyn 31, N.Y. Check CP 8647 opposite last page.)

#### Feeds labels in rolls - no glue needed

Automatic and semi-automatic production labelers, with operating speeds to 60 per minute, are described and illustrated in four-page bulletin. Units described use heat-seal labels supplied in rolls to 1500. Dimensions and operating specifications of labelers are included.

Bulletin on "No-Glu" Labelers is available from Dumatic Industries, Dept. CP, 12th St. below Jefferson, Philadelphia 22, Pa. When inquiring specify CP 8648 on handy form opposite last page.





# hard-to-pack chemicals travel in

## **Bemis Waterproof Bags**



Also in the Bemis family, serving the chemical industry...

> **Bemis Multiwall Paper Bags Bemis Burlap Bags Bemis Cotton Bags Bemis Special Thread**

Any dry, powdered or granular product travels economically in a Bemis Bag.

But Bemis Waterproof (laminatedtextile) Bags are your particular answer when you have a hard-to-pack product...one that requires special protection against moisture gain or loss, contamination, insect infestation, undesirable odors or loss of aroma.

If you need a little less than the super-protection of Bemis Waterproof Bags, your best bet is Bemis Flexiply Bags. These laminated, allcrinkled-paper bags are tough and shock-resistant...have stretch and flexibility...handle and stack easily.

Your Bemis Man will help you determine which is the practical, economical shipping bag for you. With either Bemis Waterproof or Bemis Flexiply, you get the benefits of Bemis crisp, multi-color printing ... and Bemis multi-plant service.



408 Pine St., Box 92, St. Louis 2, Mo.

When inquiring check CP 8649 opposite last page



Note the cleanliness as bag is loaded. The dust-laden air is drawn into the hood. thence through the duct to the filter. Cleaned air is returned to the plant.



Note, also, equal cleanliness in dumping. Hoods and ducts are expertly engineered to handle all the dust.





This is the Sty Dust Filter located outside the plant of the Haviland Products Company, Grand Rapids, Michigan. It handles 7,000 cfm.

and you will be free from the annoyance and hazard and expense of dust.

Such is the experience - a typical one - of the Haviland Products Co. Note how clean and dust-free bag loading and unloading now are.

Aggravated about dust — the trouble and expense it caused management over a year ago installed Sly Dust Filters. Results: the company executives are highly pleased with the better working conditions, clean plant and substantial savings realized.

Since 1874, Sly has pioneered and developed positive dust collection equipment . . . the original patentee of the cloth type filter more than 50 years ago.

No matter what you make or process - if there's dust, you need Sly.

Designers and Manufacturers of Dust Control Systems - Blast Cleaning Equipment — Tumbling Mills — Industrial Ovens.

THE W. W.



#### MANUFACTURING CO.

When inquiring check CP 8650 opposite last page

#### PACKAGING

#### Pictures bottle cappers and cap feeders

Automatic screw capping units with four, six, and eight heads are described and illustrated in six-page bulletin.

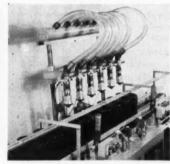
Bul 128 is available from Pneumatic Scale Corp., Ltd., Dept. CP, Box 1019, Quincy 17, Mass. When inquiring specify CP 8651 opposite last page.

#### Automatically fills 1200 5-gal cans per hour . . .

unit maintains speed even with viscous oils

Uses: Filling five-gallon round or blitz cans.

Features: Machine is fully automatic, requires no operator, and will fill 1200 five-gallon cans



Cans come to complete standstill during filling

Description: Operating by means of pressure and vacuum, unit is capable of maintaining high filling speed even with heavy, viscous oils.

Cans come to a complete standstill during filling, eliminating needless agitation of material and risk of damage to filling spouts or containers. Centering device brings can openings under filling spouts.

(Can-filling machine is a product of Perl Machine Mfg. Co., Inc., Dept. CP, Jay and Front St., Brooklyn, N.Y. Check CP 8652 opposite last page.)



"Stop searching Beardsley! We've just discovered Clearsite Plastic Containers."

Moisture-tight! Dust-proof! Non-toxic! Just three of many reasons why Clearsite makes an ideal container. Available in many sizes and varieties of closures. Any trade-mark or label can be multi-color printed right on the feather-light, shatterproof container.

Write for free samples and descriptive literature.



General Offices: 48 Avenue L, Newark 5, N. J.



When inquiring check CP 8653 opposite last page



- A truly portable bag closer . . . Weighs only 10½ pounds.
  • Requires no installation . . . plug
- into any outlet.
- Handles textile and paper
- · Simple to operate and maintain.
- · Lowest priced bag closer on the market.

State..... When inquiring check CP 8654 opposite last page

38 Glenwood Ave: N.

Name....

Firm Name....

Address

City.....

AU

Minneapolis, Minn.

#### For "hard-to-hold" products, one-gal drum is available with baked lining

metal or plastic pouring spouts are optional

Where shipment, storage, dispensing of smaller quantities of liquid chemicals is called for.

Features. One-gallon drum is available with either a regular interior coating or a hi-bake lining for dangerous and "hard-to-hold" products. Metal or plastic spouts are optional. On request, lining can be specified to meet product requirements.





One-gallon drum with cap on (left) and with spout extended

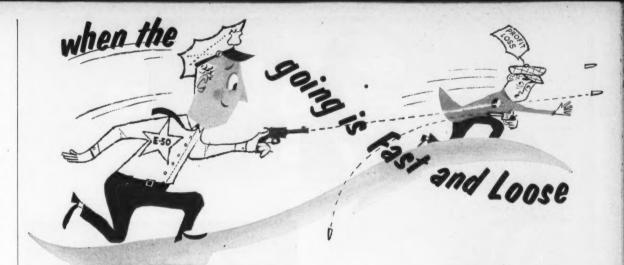
Description: Drum is standard ICC-17E container, round in shape with welded side seams and double-seamed ends. Top is necked in to provide for stable stacking, and has a carrying handle and a recessed 45 mm screw cap.

(One-gallon drum is a product of Vulcan Stamping and Mfg. Co., Dept. CP, PO Box 161, Bellwood, Ill. . . . or for more information check CP 8655 on handy form opposite last page.)

#### Speeds small-item labeling

Compact dispenser for pressure-sensitive labels, designed to reduce cost of hand labeling by dispensing labels fast, is described in illustrated data sheet.

Form 53, B-552 is available from Avery Adhesive Label Corp., Dept. CP, 1616 S. California St., Monrovia, Calif. When inquiring specify CP 8656 on handy form which is opposite last page.



When the weighing is fast and the materials are loose (or even sluggish!), and you're having a running battle with profit loss from weight inaccuracy or the high cost of bagging and scale upkeep . . .

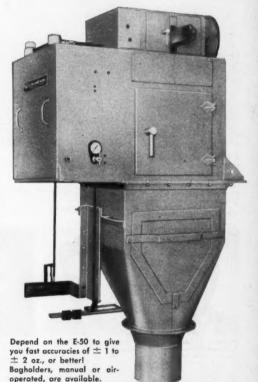
here's one scale that won't let you-or your profits-down!

IT'S DEPENDABLE! The E-50's work-horse dependability makes it the perfect choice for any plant where output vitally depends on the perfection of the bagging scale. And upkeep is low! You'll find Richardson Scales still in operation after 30 and more years of service.

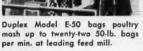
IT'S FAST, ACCURATE! With the rugged, completely automatic Richardson E-50 you'll get high speed bagging with accuracies that never before were a practical possibility-up to 1/10 of 1% under optimum conditions.

IT'S VERSATILE! Unique design permits the weighing of hundreds of food, chemical, grain and other materials. The E-50 is equally efficient as an independent bagging machine, or as an integral part of a co-ordinated production line packaging system. Don't let weight inaccuracy and bagging costs pick your pockets.

Find out about the scale that really unties production tie-ups-Richardson E-50. Write today for free illustrated bulletin #3749A that tells the whole cost-saving E-50 story!









Ten 50-lb. bags per min. of biotic are delivered from Duplex E-50 in major pharmaceutical plant.



#### RICHARDSON SCALE COMPANY . Clifton, New Jersey

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G



#### Cleans bottles on outside after they have been filled and sealed . . .

unit removes impurities left by spillage or cleaning-water film

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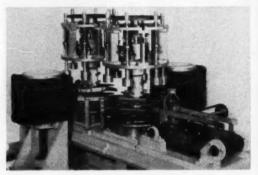
tion

AUG

Intended for use in areas where water leaves a film on bottles during preliminary cleaning, unit could be used to cleanse bottles of impurities due to spillage, etc.

Machine removes impurities from Features: outside of bottles and prepares them for packing. It is adjustable to clean bottles of different heights. Carrying discs are interchangeable to take bottles of larger or smaller diameters.

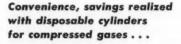
Description: In operation, cleaning machine feeds bottles along a flat belt conveyor. Two circular tables then rotate bottles past a dry steam spray and against two long trim nylon cylinder brushes. Long trim cleans necks of bottles as well as large outside diameters.



Dry steam spray and nylon brushes clean outsides of bottles

Entire unit is hooded and is connected with an air exhaust system that keeps condensation from steam to a minimum. Machine speed can be adjusted to match production requirements.

(Bottle cleaning machine is a development of Machine Div., Fuller Brush Co., Dept. CP, 3641 Main St., Hartford 2, Conn. . . . or for more information check CP 8658 on handy form opposite last page.)



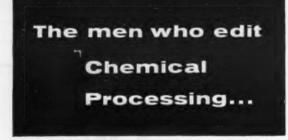
protect purity of product and eliminate deposits, return transport costs

Marketing refrigerants, chemicals, insecticides, propane, and other aerosols and compressed gases.

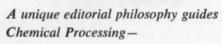


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"Executive Magazines For Industry"



Features: Cylinders are disposable. Each cylinder used is new thus protecting product purity



Cylinders are easy to use and carry

and moisture content. Costs of deposits, return transportation, and refunds are eliminated.

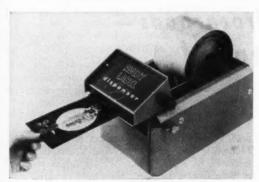
Description: Easy to carry and use, cylinders are available in sizes ranging from 3 to 6" diameters with lengths up to 30". Sizes make possible accurate packaging of aerosols by weight, volume.

(Disposable cylinders are products of Tube Manifold Corp., Dept. CP, 1100 Military Rd., Buffalo 17, N.Y. Check CP 8659 opposite last page.)

# Labeling operations speeded by automatic dispenser

Uses: For varied labeling operations, dispenser is designed to handle company's Kum-Kleen or Perma-Grip self-adhesive labels.

Features: Operation of unit is fully automatic. As one label is removed from mouth of dispenser, another rolls out automatically, ready for application. Depending on requirements, one or several labels can be supplied at once.



As one label is removed, another takes its place

Description: Dispenser has no foot switches or rheostat controls. Automatic operation is actuated by micro-switch devices and a 50w motor. Housing of unit is aluminum and weight is only 11½ lb. (Label Dispenser "55" is a product of Avery Adhesive Label Corp., Dept. CP, 1616 S. California Ave., Monrovia, Calif. . . . or for more information check CP 8660 opposite last page.)



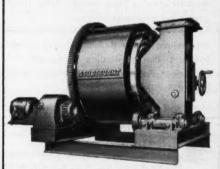
The Sturtevant Micronizers are fluid jet grinding machines designed to reduce solid materials to particle sizes in the micron

Using compressible fluids, air or steam, as the source of energy, Micronizers produce pulverized materials to specifications unobtainable by other mechanical equipment such as ball, pebble or hammer mills.

The variety of materials processed is large and includes both nonmetallic and metallic minerals and ores, metals, pigments, insecticides, fungicides, pharmaceuticals, plastics, dyes and numerous other organic and inorganic products.

It is quickly and easily cleaned on changes of formulation with minimum loss of material. Simple to install and operate. It is available as a machine alone . . . or as a complete grouping with premixing, grinding and bagging equipment. Write for complete information, today.

\*Micronizer is the Registered Trademark of the Sturtevant Mill Company.



Sturtevant Dry-Batch Mixer for mixing materials into a homogeneous mass. 5 models: ¼ to 2 tons.

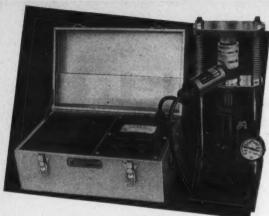
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Designers and Manufacturers of CRUSHERS • GRINDERS • SEPARATORS • CONVEYORS

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When inquiring check CP 8661 opposite last page



# Is improper moisture in your products...



Any yesses? Then it will pay you to find out how the Granular Moisture Register model G5, operating on high frequency power loss principle, will indicate moisture content quickly and dependably, help solve those problems with ... I-minute tests on the spot!

• Practical Accuracy Guaranteed! • No skilled technicians! • Two weeks free trial! • Most granular products such as:

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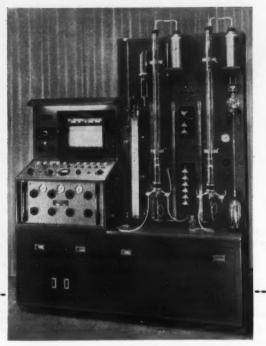
When inquiring check CP 8662 opposite last page

#### for the laboratory

#### Here's how instrument works . .

High-sensitivity thermoconductivity cell receives distillate vapor from reflux column. Variation in bridge voltage is approximately linear function of gas mixture composition. Dry air is used as reference gas in calibration. Vapor flow rate through cell is controlled by differential thermocouple located at top of reflux column. Signal from thermocouple is received by bridge control circuit, converted to AC and amplified to operate a solenoid valve. This valve is located after conductivity cell in distillate vapor line. Distillate vapor therefore passes through cell before reaching valve, eliminating effect of liquid hold-up. Cell reduces "pipeline" vapor hold-up to no more than 2 cc, volume of cell cavity.

Boiling point and thermoconductivity curves are plotted simultaneously by recorder at left



Skill and unflagging attention can mean as much as actual composition of sample in making accurate analyses of light hydrocarbons. Now, by controlling reflux rate automatically, "robot" thermal conductivity unit . . .

# analyzes hydrocarbons — unattended

Once unit has been started, recording and operation are automatic. Analysis of 100 cc gas sample is accurate, complete in one hour

With conventional techniques, accurate results in LTFDA (low temperature fractional distillation analysis) depend greatly on skill and training of the analyst. He must control reflux rate exactly, maintain proper reflux ratio, allow for vapor hold-up, and make no errors in calculation. At best, he can only make a close guess at factors like liquid hold-up in reflux column.

Unlike "pipeline" hold-up of vapor which can be

calculated, liquid hold-up (wetting of thermocouple and walls of distilling tube above it) cannot be measured. Liquid in this film sometimes amounts to 65 cc additional vapor equivalent. And if sample size is increased to reduce effect of this liquid hold-up, running time is increased. Since hold-up varies with heat input, boiling point of sample, distilling rate, and boiling point difference of hydrocarbons in sample, it cannot be easily predicted.

Basis of the trouble comes from using dew point method of identifying distillate. Liquid is formed in wetting and warming thermocouple to dew point temperature.

Using thermoconductivity cell, instrument has been developed to handle LTFDA almost automatically. Sensitivity is good enough to identify isopentane

CHEMICAL PROCESSING

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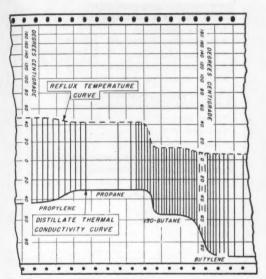
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Curves in chart above show reflux temperature and

from n-pentane. Change in distillate composition is rapidly followed. Instrument is relatively insensitive to pressure changes, has stability and freedom from drift.

Speed of distillation has been greatly increased over past methods. Conductivity cell is located ahead of distillate control valve to by-pass problem of liquid hold-up. Signal from differential thermocouple located in top of column controls opening of distillate valve. This valve opens automatically to increase distillation rate when a pure compound wets thermocouple. Valve closes to increase reflux rate when a higher boiling compound contacts thermocouple and again opens when pure compound is present.

Data are automatically recorded. Temperature and thermoconductivity curves are recorded simultaneously. "Break points" are indicated by changes in slope of curves

Instrument analyzes gas samples small as 100 cc, liquid samples of 200 cc. It covers distillation temperatures from minus 200 to 20°C, distillation pressures from atmospheric to approximately 20 mm. Unit has built-in re-analysis system for checking accuracy. This can also be used for fast binary analyses. Accurate analyses can be completed in an hour.

Instrument is 70 x 19 x 87", requires approximately 1500 watts at 115v AC, including vacuum pump.

("Thermocon" analyzer is product of Podbielniak, Inc., Dept. CP, 341 E. Ohio St., Chicago 11, Ill. . . . or for more information reader may simply check CP 8663 on the convenient Reader Service slip which is located opposite last page.)

Now . . the ultimate in safety!

# the **NEW**



(Pat. Pending)



# GLAS-COL

Trademark Registered U. S. Patent Office

#### **ELECTRIC HEATING MANTLES**

Specialists in Laboratory and Pilot Plant Heating Problems

For additional information on the new Glas-Col CO<sub>2</sub>-Purged Heating Mantle, ask for Bulletin 101.

# Glas-Col CO<sub>2</sub>-Purged Heating Mantle

Flashing of flammable vapors is practically impossible with this new Glas-Col CO<sub>2</sub>-Purged Heating Mantle.

Here's how it works: At the bottom of the mantle's aluminum housing, there is an inlet which permits a slow stream of CO<sub>2</sub> gas to pass through the interior of the heating mantle. Thus, the mantle's interior, and more particularly, the heating elements are continuously blanketed with CO<sub>2</sub> gas.

The new Glas-Col CO<sub>2</sub>-Purged Heating Mantle represents the most important advance in heating mantle design to date.

Glas-Col CO<sub>2</sub>-Purged Heating Mantles are available in a wide range of sizes\*, shapes, and types, in standard and custom-made models; in the new super-tough Glas-Col "R" fabric, as well as in glass or quartz fabrics.

Temperatures can be precisely controlled up to 650° C . . by means of a variable transformer.

Glas-Col Apparatus Company, Dept. CP, 711 Hulman Street, Terre Haute, Indiana.

\*Capacities range 1 liter to 72 liters

When inquiring check CP 8664 opposite last page

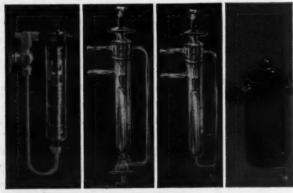


PULVERIZER COMPANY Originators and Manufacturers of 1241 Macklind Ave.,

Ring Crushers and Pulverizers St. Louis 10, Mo.

When inquiring check CP 8665 opposite last page

for automatic vacuumand pressure control



# MANOSTATS

They remember your vacuum setting The EMIL GREIVER Co. even after shutting down system! Exclusive with Emil Greiner! No other instruments in the field can compare with these remarkable Cartesian Manostats for sensitivity, accuracy and reliability. Designed on the simple phenomenon of the Cartesian Diver, their construction, installation and operation is uncomplicated and dependable.

For complete information, write for Constant Pressure and Vacuum Control Bulletin.

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Please a	end me Cartesian	Manostat Bulletin.
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When inquiring check CP 8666 opposite last page

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#### LABORATORY

Replace clamps, screws with knobs for fast light setup . . .

> three microscope lights serve general and special purposes

Uses: Three microscope illuminators in similar designs have some common features. Of these, two produce true Koehler illumination, one is specially designed for high intensity light in photomicrography, and one is a general purpose illuminator.

Features: Knob controls are used for all adjustments. Screws and clamps have been eliminated.

Description: Correct light adjustment can be quickly attained with external knob controls of redesigned microscope illuminators. Replacement lamps center auto-



External knobs simplify adjustment problems

matically without adjustment. Housings are dustproof and are reported to operate coolly even after hours of continuous use.

Research Model PR-27 has many adjustments for versatile lighting performance.

Model PG-26 provides high intensity illumination. Accessories including iris diaphragm are available.

Model PL-25 is a general purpose illuminator.

(Microscope Illuminators are products of Bausch & Lomb Optical Co., Dept. CP, 635 St. Paul St., Rochester, N. Y. . . . or for more information check CP 8667 on handy form opposite last page.)

# King MANOMETERS

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- Double Cleanout
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Stay clean longer Easy to service

Low in price

Trouble-free

Easy to install

and read

#### **Multi-Tube Manometers**

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- Special-Purpose

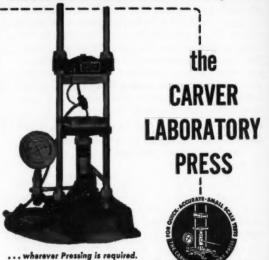
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When inquiring check CP 8668 opposite last page

#### Standard for Research and Development



Accurately controlled pressures to 20,000 lbs.; 6-inch gauge mounted on base. Carver Standard Accessories include Electric or Steam Hot Plates, Carver Test Cylinders, Swivel Bearing Plates, Cage Equipment. Available from stock. Write for catalog.

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When inquiring check CP 8669 opposite last page

CHEMICAL PROCESSING

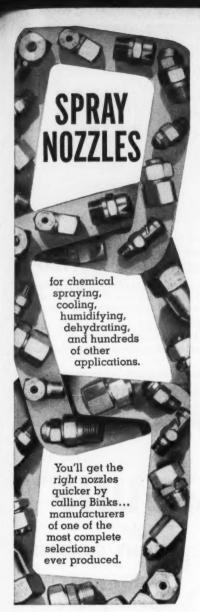
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A wide range of spray patterns, sizes, capacities...with nozzles cast or machined from standard or special corrosion-resistant metals.

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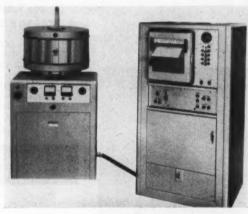
When inquiring check CP 8670 opposite last page

Curved crystal replaces flat
— now 8 X-ray analyses
run at once . . .

recording console takes information from unit to make permanent record in percentage

Uses: Designed specifically for rapid, nondestructive chemical analyses of metals, powders, and liquids.

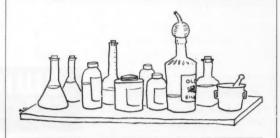
Features: Instead of analyzing for one element at a time, curved crystal makes it possible to analyze as many as eight elements at one time.

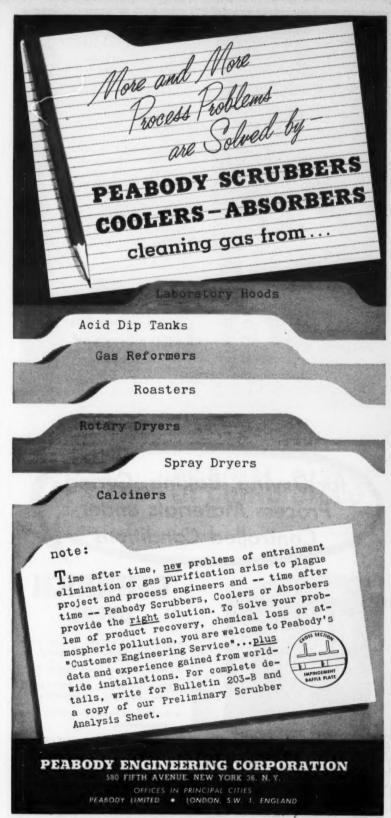


Ink graphs show results of analysis in two minutes with this X-ray quantometer

Description: Phenomenon of fluorescence of materials exposed to X-rays and analysis of this fluorescence is used in analyzing samples. Curved crystal spectrometer has higher sensitivity. Precision and speed of analysis is also better with curved crystal than with flat.

(Model 10,500 Curved Crystal X-Ray Quantometer was developed by Applied Research Laboratories, Dept. CP, 4336 San Fernando Rd., Glendale, Calif. . . . or for more information reader may simply check CP 8671 on handy form which is located opposite last page.)

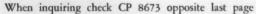




When inquiring check CP 8672 opposite last page

VG







When inquiring check CP 8674 opposite last page

LABORATORY

Tests radii of curvature up to 60 miles . . .

measures planeness of polished surfaces

Uses: Interferometer tests planeness of polished surfaces in electro-plating.

Features: Interference images free from reflection are produced. Images are sharp and undistorted.

Description: Interferometer tests planeness of polished surfaces with Fizeau fringes, radii of curvature by Newton's rings, plane parallelism by Haidinger



Test surface is observed through viewer in upper left

rings. Instrument lends itself to comparison measurements on end gages. Surfaces up to 5½" can be tested for planeness. Radii of curvative up to 60 miles of optical surfaces can be measured.

(Interferometer is product of Wm. J. Hacker & Co., Inc., Dept. CP, 82 Beaver St., New York 5, N. Y. . . . or for more information check CP 8675 on handy form opposite last page.)

Processing and Engineering
Data begins on
page 196



Bellows and checks, seals and connections are fabricated from Teflon\* in the new CORSON-CERVENY MICRO-BELLOWS PUMP

Because of the use of Teflon in the Corson-Cerveny Micro-Bellows Pump, it can handle practically all acid and alkali chemicals over a wide temperature range.

Rates are 400 to 8000 ml per hour, and can be adjusted while pump is in operation.

Write for complete information, descriptive data and prices.

\*DuPont's trade mark for its tetrafluoroethylene resin.

#### RESEARCH APPLIANCE COMPANY

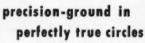
143 Cemetery Lane Pittsburgh 9 Pd

When inquiring check CP 8676 opposite last page

# Call SWIFT



#### for SIGHT GLASSES





Let us supply you with Perfectly True Circles precisionground from heat-resistant Pyreex Polished Plate Glass . . used by major chemical companies from coast to coast. Resist clouding, pitting, chemicals (except HF and strong hot caustic solutions).

We can deliver immediately specially cut round, square, rectangle or odd-shaped Sight Glasses in 8 thicknesses (½" to 1"), sizes up to 24" x 60". Write, wire or phone for quotation. Ask for Sight Glass Bulletin.

# SWIFT Glass Division

330 Tenth St., San Francisco 3 • 140 Boylston St., Boston 16 807 Mateo St., Los Angeles.

When inquiring check CP 8677 opposite last page

AUC

## Plastic Pelletting Problems Solved Here



Taylor-Stiles cutters are designed and built to meet the special requirements of each customer.



Basic principles are standardized as the result of over 90 years experience. But Taylor-Stiles does not insist on selling something made in quantity production.

Every manufacturer of plastic compounds must have details changed to meet his special conditions. We cooperate.

If noise is important — it is controlled. Size of cuts is whatever is desired. Width, speed capacity, weight are all made to suit.

And if any difficulty develops, whether our fault or not, we stay with it until it is licked.

We illustrate two typical examples. The 710 Pelleter was made expressly for extruded rods. Compare it with our type 24% which was designed to take a 42" widesheet, to slit it and then cross cut it into 1/2" squares.



20 Bridge Street

Riegelsville, N. J.

When inquiring check CP 8678 opposite last page

Operator makes own thermocouples as needed with low voltage electric welder . . .

use 14-30 wire for Constantan with Chromel, copper, iron or Chromel-Alumel

Thermocouples can be made as needed in the laboratory with electric welder. Unit is designed for use by laboratory technicians. It eliminates need for electric carbon arc lamps, oxygen-acetylene apparatus, other equipment which requires particular skill in flame adjustment or metal welding techniques.

Using this welder, operator adds flux to metal, touches the couple to electrode and presses button. Wire sizes from 14-30 can be joined to make (among others) thermocouples of Chromel-



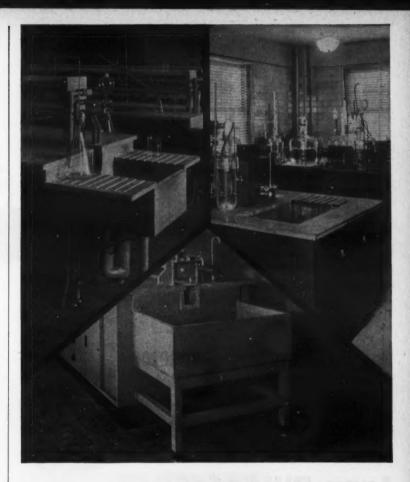
Alumel, Chromel-Constantan, copper-Constantan, iron-Constantan, and platinum-rhodium. Welder is safe to use since components are encased in single compact housing. Adjustable filter is permanently mounted on top of unit to protect operator from flash. No high voltage is used—installation requires only 115 volt 60 cycle power.

(Kup-L-Weld is a product of Burrell Corp., Dept. CP, 2223 Fifth Ave., Pittsburgh 19, Pa. . . . or for more information check CP 8679 on handy form opposite last page.)

## Shows 350 laboratory instruments and gives prices on 14,000

Prices on manufacturer's line of laboratory equipment which includes 14,000 items plus descriptions of 350 laboratory instruments are listed in 64-page catalog. Photographs and descriptions of new and improved laboratory equipment are given. Much of the equipment described is designed and manufactured by company's own laboratories and instrument shops.

Labaratus is issued by Central Scientific Company, Dept. CP, 1700 Irving Park Road, Chicago 13, Ill. . . . When inquiring specify CP 8680 on handy form which is located opposite last page.



## Let's talk "SPECIAL SIZES"

The size and depth of sinks for laboratory and industrial use should be determined by the job they have to do — and not by available standard sizes!

With Alberene Stone sinks you can specify any size and depth — without paying a premium.

And with Alberene Stone you get — the natural silicate stone with the surface that goes all the way thru. Its all-silicate mineral components resist chemical attack. Low absorbency makes it essentially nonstaining. Discolorations can be removed by scouring or honing without harm to the surface.

For information and technical assistance, address: Alberene Stone Corporation, 419 Fourth Avenue, New York 16, N. Y.

## ALBERENE STONE

provides LOW ABSORBENCY protection

When inquiring check CP 8681 opposite last page



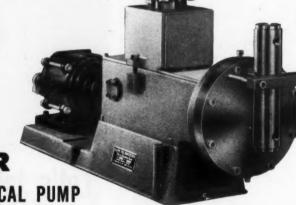
IT METERS...

IT PROPORTIONS

IT FEEDS ...

WITHOUT LEAKAGE OR

CONTAMINATION



## Lapp PULSAFEEDER

CONTROLLED-VOLUME CHEMICAL PUMP

If your process requirements demand accurate handling of corrosive and non-corrosive liquids, here is the pump for the job. The Lapp Pulsafeeder is a piston-diaphragm pump... it has positive displacement with no stuffing box. The product being pumped is isolated from the drive mechanism by a hydraulically balanced diaphragm, thus preventing leakage or contamination of the product. Pumping speed is constant; variable flow results from variation in piston-stroke length...controlled manually by hand-wheel, or, in Auto-Pneumatic models, by instrument air pressure responding to any instrument-measurable processing variable.

WRITE FOR BULLETIN 440 with typical applications, flow charts, description and specification of models of various capacities and constructions. Inquiry Data Sheet included from which we can make specific engineering recommendation for your processing requirement. Write Lapp Insulator Co., Inc., Process Equipment Division, 481 Wilson Street, Le Roy, N. Y.

Lapp

When inquiring check CP 8682 opposite last page



Operator is milling paint sample of less than pint on lab-size roller mill

## Saves money on lab materials — grinds as little as 4 oz of paint or enamel

lab-size roller mill can grind from  $\frac{1}{4}$  pint to quart of paint or enamel or  $\frac{1}{2}$  pound printing ink

Uses: For grinding paints, enamels and printing inks on laboratory scale.

Features: Three-roller mill grinds ½ pint to quart of paint or enamel or ½ lb printing ink in five to ten minutes. Cleaning time is reduced to several minutes.

Description: Three rolls are case-hardened steel tubing 5" long,  $2\frac{1}{2}$ " in diameter. Rolls are ground to be true with the journals. Journals have sufficient area to insure long service. Roll adjustment is in graduations of 0.001". Adjustment is maintained by locks. Driving gears are totally enclosed in oil-tight housing. Mill speeds are 107, 214 and 428 rpm.

Apron has separate blade which can be removed and replaced without disturbing adjustment. Motor is ½ hp and can be furnished for AC or DC. Length, including motor, is 24", width 11¼", height 8¼". Weight is 160 lb.

(Fritsch roller mill is product of Kentucky Color & Chemical Co., Dept. CP, 600 N. 34th St., Louis-ville 12, Kentucky . . . or for more information about manufacturer's product, reader may simply check CP 8683 on the convenient Reader Service slip which is located opposite last page.)



Whether the job calls for cleaning heavy duty tanks of metal, plastic and glass lined, or cleaning general equipment, Alconox combines power with the gentleness that spells SAFELY CLEAN.

Compounded from numerous different chemicals Alconox is blended into a fast acting multiple cleaning detergent that meets your cleaning needs every time—and at 2½ cents per gallon.

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Used by leading industrial firms who found it better for such varied uses as cleaning ball bearing assemblies, optical lenses and industrial glass piping systems, after recommendations by their own research departments.



Literature, Samples and the name of your nearest distributor upon request.

For specific problems write or call our Technical Departmen

ALCONOX, INC., 61-63 Cornelison Ave., Jersey City 4, N. J.

When inquiring check CP 8684 opposite last page

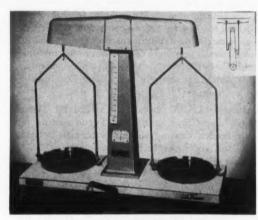
Double-chain balance weighs bulk chemicals rapidly in plant or lab . . .

chain-loading is adjustable to ten mg, sensitivity of the balance

Uses: For rapid bulk weighing of chemicals and check-weighing in plant or laboratory.

Features: Chain-loading of balance eliminates use of fractional weights.

Description: Balance has one-kgm capacity and sensitivity of ten mg. Two chains are used so



Inset shows method of double-chain loading

equilibrium of beam is not upset on raising the beam into weighing position. Weighing mechanism is protected by metal housing. Stainless steel pans are six inches in diameter.

(Reyers-Rapid balance is product of Arthur S. LaPine & Company, Dept. CP, 6001 S. Knox Ave., Chicago 29, Ill. . . . or for more information check CP 8685 on handy form opposite last page.)

### Describes "what's new" for the lab

Illustrating 27 new and improved laboratory instruments and supplies, 20-page booklet in two colors includes descriptions of four new Beckman instruments. Silicone rubber-coated electrical heating tape is also described plus an automatic test-tube washer, constant temperature circulator for converting any suitable container into a water or oil bath, shaking incubator, distilled-water heater and others.

"What's New" is issued by Scientific Glass Apparatus Co., Inc., Dept. CP, 100 Lakewood Terrace, Bloomfield, N. J. When inquiring specify CP 8686 on handy form which is located opposite last page.

Now...you can go beyond the limitations of older analytical methods... analyze quickly and accurately for those compounds above the octanes that are gaining ever-greater importance. CEC's newest analytical mass spectrometer... Type 21-103C... quickly, accurately determines mixture components at mass numbers as high as 700... yet is equally at home in the field of gases and light liquids.

Only an hour or less is required for even complex mixture analyses (just minutes for key components) that once took weeks by fractional-distillation methods.

For fundamental petroleum and petrochemical research, for process development and for control, investigate the 21-103C. It makes an already important scientific tool—mass spectrometry—even more useful and versatile.

Complete details in our new brochure... send today for CEC 1800C-X14.



through

barrier

the octane

Ideal for exploratory analyses, the 21-103C registers every component of a sample... whether or not its presence is known.

#### **Consolidated Engineering**

Corporation

ELECTRONIC INSTRUMENTS FOR MEASUREMENT AND CONTROL

300 North Sierra Madre Villa, Pasadena 15, California

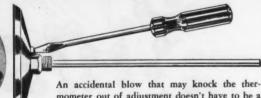
Sales and Service Offices Located in: Albuquerque, Atlanta, Buffalo, Chicago, Dallas, Detroit, New York, Pasadena, Philadelphia, Seattle, Washington, D. C.

When inquiring check CP 8687 opposite last page

## **EXCLUSIVE!**

#### YOU CAN RECALIBRATE THE ROCHESTER DIAL THERMOMETER EXTERNALLY . . .





mometer out of adjustment doesn't have to be a serious problem. External recalibration, exclusive with Rochester Dial Thermometers, can be done easily and quickly. Insert the stainless steel

stem in any liquid of known temperature and adjust the dial with the set screw attachment. It's done easily and quickly, EXTERNALLY, and is completely accurate.

Other plus features include:

All parts, except the crystal, are of corrosion-resistant stainless steel.

Hermetically sealed against moisture and grime.

All readings are completely legible and accurate.

Precision bi-metal helices precalibrated to dial before assembly.

Stem position can be located anywhere around circumference of the dial in the STRAIGHT form thermometers.

Your Rochester representative will be glad to give you additional information, or address your inquiries directly to the Rochester Manufacturing Company, Rochester...



DIAL THERMOMETERS • GAUGES • AMMETERS

When inquiring check CP 8688 opposite last page

### A SYNCHRONIZED PICTURE... Of Your LABORATORY

METALAB Equipment synchronizes laboratories by:
INTEGRATING PERSONNEL MOTION into an
efficient laboratory layout . . . saves job time.

COMBINING STANDARDIZED UNITS with a customized installation . . . saves planning expenditures.

COORDINATING MECHANICAL SERVICES with maximum utility and economy... saves construction costs.

Our complete line of Sectional Units designed for interchangeability and flexibility assures you a synchronized installation which will produce peak laboratory efficiency.

#### METALAB Equipment Corp.

230 DUFFY AVE., HICKSVILLE, LONG ISLAND, N.Y.

NAME	TITLE	**********
ORGANIZATION		
ADDRESS		
Author .	70HF 5747F	

146



When inquiring check CP 8689 opposite last page

#### FOR THE LABORATORY

"Wrist-shaking" action gives rapid blending in bottle shaker . . .

snap-spring bottle fasteners can hold containers of many shapes and sizes

Uses: Laboratory shaker for mixing samples, lab preparations.

Features: Shaker accommodates standard or oddshaped bottles or other containers from 500 to 1000 cc capacity, pint-sized fruit jars.

Description: Shaker combines "wrist-shaking" vertical and horizontal motions and is driven by 1/4-hp electric motor. Adjustable friction drive provides for 428 to 750 shakes per minute. Automatic timer allows continuous operation or timed cycles from one minute to one hour. An optional timer allows timed cycles to five hours. Snap-spring holds containers securely and allows fast loading and unloading.

Cushioning against shock is provided by Tygon plastic tubing over spring and Tygon coating on bottle holder. Coating also gives corrosion-proofing. Four, six, or eight bottles or containers, depending on shaker model, can be handled at one time.

Shaker requires only 15 x 15" floor space and can be moved readily. However, non-skid feet prevent unit from moving during operation. Height, including shaker head, is 23". Unit operates on 115v AC, single phase. Motors can be open, totally-enclosed, or explosion-proof.

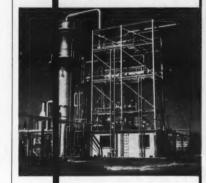
(Gyroblend shakers are product of Gardner Laboratory Inc., Dept. CP, 4723 Elm St., Bethesda 14, Maryland. . . . or for more information about the manufacturer's product, reader may simply check CP 8690 on the convenient Reader Service slip which is located opposite last page.)

#### Revised specs for lab weights

First revision of National Bureau of Standard's weight classifications and tolerances since 1918 is included in 28-page two-color catalog of laboratory balances and weights. The new specifications are more comprehensive and tolerances are tighter. Group tolerances are established for weights in a set. Catalog describes micro, semimicro, analytical and assay balances, balance accessories and parts, weights, manufacturer's Right-A-Way one pan balance with 1/10 mg sensitivity.

Cat No. AW13 is issued by Wm. Ainsworth & Sons, Inc., Dept. CP, 2151 Lawrence St., Denver, Colo. When inquiring specify CP 8691 on the convenient Reader Service slip which is located opposite last page.

petrolite waxes
are highly
refined
"end-products"
not "by-products"



they are designed to extend or completely replace costly vegetable waxes



### WAXES

Specially refined for use in
EMULSION POLISHES
SOLVENT PASTE POLISHES
SOLVENT LIQUID POLISHES
PRINTING INKS
CARBON PAPERS
MOISTURE PROOFING
PAPER COATINGS
INVESTMENT CASTINGS

The Petrolite Technical Service Staff is always ready to cooperate with manufacturers on any problem relative to the uses of Petrolite Waxes. Samples, technical information and prices are available upon request.

Petrolite waxes are stocked at, and shipped from Jersey City, Chicago, Los Angeles, Kilgore.

#### PETROLITE CORPORATION

WAX DIVISION

Chrysler Bldg., New York 17, N. Y.
P. O. Box 390, Kilgore, Texas

When inquiring check CP 8692 opposite last page

Add nine new chemicals to envelope-packed reagents . . .

> efflorescent, deliquescent and photosensitive materials packed in polyethylene packages

Nine chemicals have been added to the list of reagents packed in triple-laminated envelopes (see CHEMICAL PROCESSING page 127 for February,

Tests have shown the polyethylene, aluminum foil, and acetate packages are excellent containers even for efflorescent, deliquescent and photosensitive chemicals. Chemicals are packed in 25 gram envelopes (except for Ammonium Molybdate which comes in 10 grams) and are certified reagent grade.

Additions are:

NE

G

Boric Acid, Granular Boric Acid, Powder Citric Acid. Granular Citric Acid. Powder

Tartaric Acid, Granular Tartaric Acid, Powder Aluminum Potassium Sulfate Ammonium Molybdate Ammonium Dichromate, Granular

Free samples are available.

(Gram-Pacs are a product of the Fisher Scientific Co., Dept. CP, 717 Forbes St., Pittsburgh 19, Pa. . . . or for more information check CP 8693 on handy form opposite last page.)



Made in four sizes from 1/10 to 5 ml, these pipets are designed for use with narrow mouth apparatus, small volumetric and Warburg flasks, absorption cells, micro-centrifuge tubes. Serological type is graduated to the extreme tip; the Mohr is graduated to a base.

(Long-tip Pipets are made by Kimble Glass Div., Owens-Illinois Glass Co., Dept. CP, Box 1035, Toledo 1, Ohio . . . or for more information check CP 8694 on handy form opposite last page.)

Every 10 Seconds

there's a completely new

filter face on a DICALITE FILTERCAKE

> For all practical purposes, that means that you have a continuously fresh filtering surface all the time-for consistent clarity and constant flow rate. The mechanism of this is simple. The particles of Dicalite filteraid added to the raw liquor as "body-feed" travel with the liquor into the filter; there they are caught and held by the precoat or filtercake on the filter screens (together with the unwanted solids from the liquor) while the clarified liquor continues through.

This unretouched photograph of a section through an actual Dicalite filtercake shows the even dispersion of unwanted impurities throughout the cake and how easily the clean precoat peels from the screen or cloth. Inset shows surface magnified 75 times.

This continuously fresh filter face means that unwanted solids cannot mass together to blind the screen and halt the filtering action - a point of major importance in the case of slimy, sticky or gelatinous impurities. Instead, they are dispersed, distributed through the filtercake in such scattered fashion that the millions of microscopic channels through the filtercake remain open for maximum throughput combined with exceptionally "sharp" separation of solids.

No matter what your filtration problem, whether it be desired clarity or fast flowrate, it is very probable that it can be answered with one or another of the Diealite family of filteraids...the finest in diatomaceous materials. For complete information, write to

1930 • 1955



DICALITE DIVISION: GREAT LAKES CARBON CORPORATION, 612 S. FLOWER ST., LOS ANGELES 17, CALIFORNIA

When inquiring check CP 8695 opposite last page

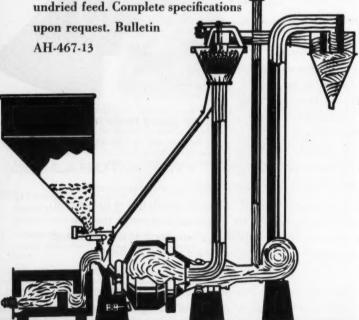
## change from... 40 MESH to 400 MESH

. . . in a few minutes, without interrupting operations. Yet any desired mesh may be maintained continuously. Ease of adjustment and close product control are possible with the . . .



## "Gyntor" Air Classifier

The Hardinge Gyrotor Classifier system, combined with a Hardinge grinding mill is an integrated grinding, classifying and product conveying system. Also available with an air-heating furnace for delivering a dry, ground product from

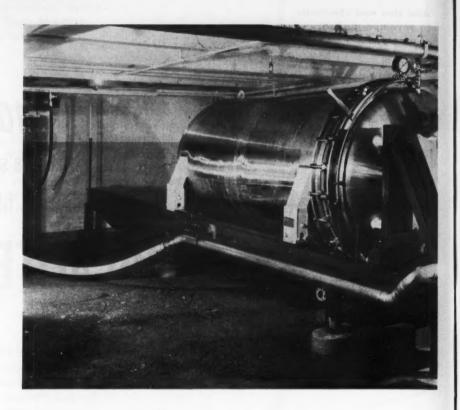


### HARDINGE COMPANY, INCORPORATED

YORK, PENNSYLVANIA · 240 Arch St. · Main Office and Works
New York · Toronto · Chicago · Hibbing · Houston · Salt Lake City · San Francisco

When inquiring check CP 8696 opposite last page

## processing equipment



What happens when a brewery replaces two filters with one? This company did it — and cut operating, maintenance and labor costs while getting a . . .

## big boost in beer production

Single unit filters 350 barrels per hour, turns out four times as much in eight hours as former two units combined

JAMES BARKER
Vice President in Charge of Production
Atlas Brewing Company
with TED F. MEINHOLD,
Assistant Editor

Problem: Although quality was satisfactory, primary filtration (first filtration after fermenters) of beer was delaying production at Atlas Brewing Company, Chicago. The two filters in use (cloth filter medium) had seen plenty of service and required considerable maintenance and repair to keep in operation. Capacities and filtering cycles were low. Cleaning the units also took considerable time and effort.

Total output for two filters was about 600-700 barrels per day (eight hours). In order to meet production schedules,

# how **BIG** should a dryer be?

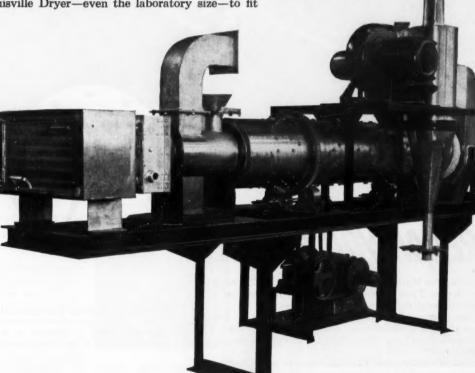
"Baby" Louisville Dryers do a man-sized production job for chemical firm

A large chemical firm has twice bought small, laboratory-size Louisville Dryers to serve as pilot plants for new materials. In both cases, their engineers were amazed to find the pilot dryers were producing sufficient quantities to supply the market!

We do everything possible to help you select the dryer size and type that's best. And we build every Louisville Dryer—even the laboratory size—to fit

the job, and to give years of satisfactory performance at rock-bottom maintenance cost.

Let Louisville's 53 years of drying experience, spanning thousands of installations for all types of industry, work for you. Why not ask one of our engineers to have a look at your drying operation? No obligation, of course.





LOUISVILLE DRYING MACHINERY UNIT

#### GENERAL AMERICAN TRANSPORTATION CORPORATION

Dryer Sales Offices: 139 So. Fourth Street, Louisville 2, Kentucky • 380 Madison Ave., New York 17, New York General Offices: 135 So. LaSalle Street, Chicago 90, Illinois In Canada: Canadian Locomotive Company, Ltd., Kingston, Ontario

OFFICES IN ALL PRINCIPAL CITIES



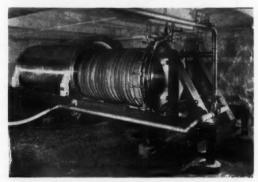
Retractable-tank, verticalplate filter in use at Atlas Brewing Company, Chicago

units had to be operated 24 hours a day.

Solution: Company installed a stainless steel, retractable-tank, vertical-plate filter. Consisting of 18 plates, unit has a total filtering area of about 400 sq ft. Six additional plates can be added if needed, increasing filter area to about 530 sq ft.

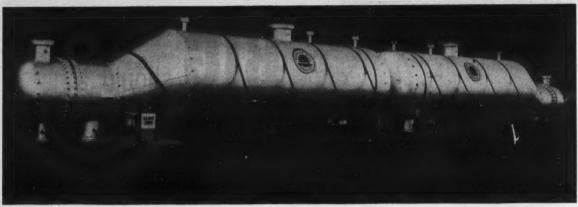
Inlet and outlet pipes are welded and permanently secured to the stationary head. With a flip of a switch, tank retracts automatically, exposing all plates for easy cleaning. There is no need to break any pipe connections or seals when opening

(Continued on next page)



All pipe is permanently secured to stationary head — eliminating need for breaking connections or seals

When inquiring check CP 8697 opposite last page





REACH YOU FASTER!

Leaving the Kewanee, Ill. works, these Ross Exchangers and Kettle Type Reboilers will travel the shortest possible routes to their new owners. Naturally!

But that's merely a matter of days or hours... hardly enough to talk about when one considers the time that Kewanee-Ross can often by-pass in engineering and fabrication.

Yes, it's a fact that Ross Exchangers and Condensers can stop the clock . . . in a number of ways . . . from the time you first consult with a Kewanee-Ross engineer until your product is delivered. (1) A great variety of standardized designs, in numerous sizes, often provide immediate solutions. (2) No matter how individualized, specially engineered units can frequently utilize many standard components and design features. (3) Unique experience over many years, in meeting greatly diversified requirements, is bound to include a "case" that closely parallels yours.

Make sure that your next exchangers and condensers reach you faster by consulting Kewanee-Ross early.

#### KEWANEE-ROSS CORPORATION

1403 WEST AVENUE • BUFFALO 13, N. Y. In Canada: Kewanee-Ross of Canada Limited, Toronto 5, Ont.





Serving home and industry: AMERICAN-STANDARD . AMERICAN BLOWER . CHURCH SEATS & WALL THE . DETROIT CONTROLS . REWANEE BOILERS . BOSS EXCHANGERS . SUNBEAM AIR CONDITIONERS

When inquiring check CP 8698 opposite last page

#### **PROCESSING**

#### BEER FILTRATION

(Continued from preceding page)

filter. Head bolts are released instantly by moving one lever. Same lever locks tank and head when in closed position — eliminating need for tightening individual bolts. He

Fee

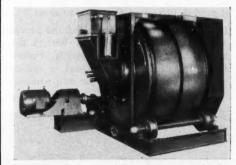
on

Filter plates are faced with stainless steel cloth. Brewery uses Celite filter aid, which eliminates need of conventional cloths. About 300-350 lb of filter aid are used for every cycle (150 lb for precoat, 150-200 lb for additions during run, or total of about 0.13 lb per barrel). Filtering is conducted at pressures ranging from 20 to 60 psi. Beer temperature is 33-34°F. Cake is removed in semi-dry state and is easily peeled off the plates.

Results: Unit filters about 350 barrels of beer per hour — turning out in eight hours almost four times as much as was formerly produced. Filtering cycle lasts 8 hours (7½ hours filtering, ½ hour cleaning).

Around-the-clock operation is no longer required — reducing labor and operating expenses. Filtered product is so clear that polishing is merely carried out as a precautionary measure. Maintenance on new unit is negligible.

(Tank model MCR vertical-plate filter is product of Sparkler Manufacturing Company, Dept. CP, Mundelein, Illinois . . . or for more information check CP 8699 on handy form which is located opposite last page.)



Rotary blending mixer has sealed mixing chamber with self take-up seal on inlet. Suitable for dry or semi-wet materials, machine has mixer flights (made of alloy steel plate) arranged to give complete blending in minimum time. Clean-out doors provide accessibility for cleaning. Mixer is available in 37, 59, and 69 cu ft capacities (based on 1/3 total volume).

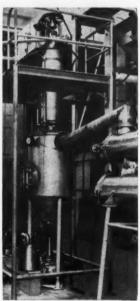
(Rotary blending-type mixers are product of Davidson-Kennedy Company, Dept. CP, 1090 Jefferson Street, N.W., Atlanta, Georgia . . . or for more information check CP 8700 on handy form opposite last page.)

## Heat-sensitives concentrated fast in single-pass unit . . .

minimizes decomposition of delicate materials

Uses: Concentrating heat-sensitives, such as resins, glues, foods, and other viscous products.

Features: Materials are quickly concentrated in one pass through unit, minimizing decomposition of delicate materials. Unit is easy to operate, clean, and maintain.



Concentrator for viscous heatsensitive materials is easy to operate, clean, and maintain

Description: terial is fed through tangential inlet at top of vertical jacketed cylinder. Highspeed rotor blades, at close clearances with heating surfaces, provide the turbulence that assures uniform heat transfer. Material is heated only a few seconds before it falls into separator chamber below, where concentrate collects in coneshaped bottom. To hasten cooling, product is withdrawn immediately by pump.

Vapors are drawn off at top of separator chamber. Entrainment is minimized. Steam, Dow-

therm, or other heating media may be used. Concentrators can be built in wide variety of sizes to meet various requirements.

(Roto-Vak concentrator is product of Blaw-Knox Company, Dept. CP, Farmers Bank Building, Pittsburgh, Pa. . . . or for more information check CP 8701 on handy form opposite last page.)

## What every engineer should know — how to buy a column

The proper way to buy column vessels is explained in three-page paper. Pointing out that equipment is among the most expensive in a chemical plant, paper emphasizes importance of submitting proper data and specifications to manufacturer. Four general rules to be followed are listed.

"How to Buy a Column" is issued by The Pfaudler Company, Dept. CP, 1000 West Avenue, Rochester 3, New York. When inquiring specify CP 8702 on handy form opposite last page.

# Handling Ammonium Nitrate and Nitrogen Solutions?

Do it better, cheaper...with

## **ALCOA ALUMINUM**

Almost from the time its ingredient, natural gas, is first taken from the earth until it is finally returned as fertilizer, AMMONIUM NITRATE and its solutions are handled extensively in ALCOA Aluminum.

For example, ammonia tanks, nitrogen chilling exchangers, prilling towers, tank cars, piping, drums and solution storage tanks of ALCOA Aluminum have been in service for years. Aluminum does not render the nitrate unstable. Moreover, ALCOA Aluminum for floor grating, structural members, housings, roofing, siding, smokestacks, sash, doors, trim, drainage trench lining, electrical fittings and devices, instrument lines and electrical conduit is giving excellent service in ammonium nitrate plants.

AMMONIUM NITRATE, AMMONIATED, does not attack aluminum. Aluminum pressure vessels, storage tanks, piping and tank cars are excellent for handling these nitrogen fertilizer solutions.

#### ALCOA NITROGEN FERTI-LIZER STORAGE TANKS

are designed for pressure or nonpressure service. Capacities range from 5,000 to 22,000 gallons.





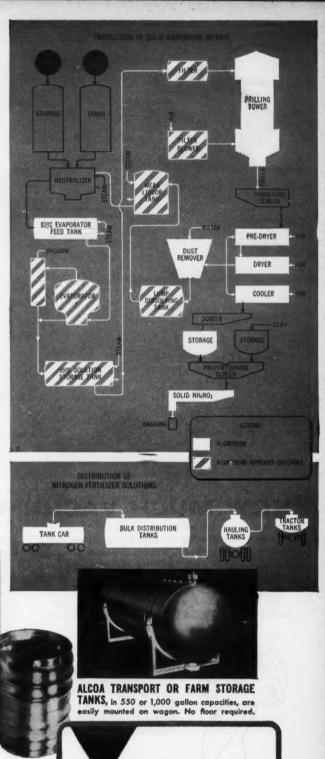
#### ALCOA APPLICATOR TANKS have standard capacities of 55, 75, 100 and

INJECTION TANKS. Alcoa's standard 55 gallon general purpose drum is readily adaptable as a fertilizer injection tank on the suction side of

irrigation systems.

FREE. New Alcoa book, Process Industries Applications of Alcoa Aluminum, 80 pages of performance and design data. Write today.

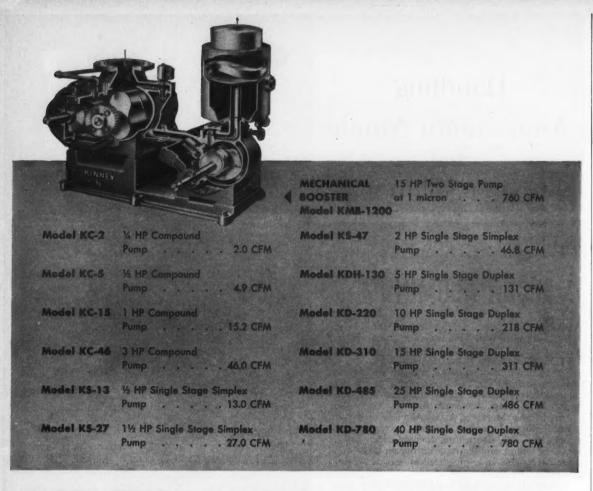
ALUMINUM COMPANY OF AMERICA 902-H Alcoa Building, Mellon Square Pittsburgh 19, Pennsylvania



When inquiring check CP 8703 opposite last page

G

LUMINUM COMPANY OF AMERICA



#### **HOW MUCH VACUUM DO YOU NEED?**

There's no economy in buying the wrong size vacuum pump. That's why Kinney has developed such a broad range of mechanical high vacuum pumps... more models, capacities, and types than any other line on the market.

For full information on Kinney Single Stage, Compound, and Mechanical Booster Vacuum Pumps, write

today for Bulletin V-54 . . . or tell us about your process problems.

Kinney District Offices in Boston, New York, Philadelphia, Cleveland, Chicago, and Los Angeles are all competently staffed to discuss vacuum with you. Los Angeles office carries complete stock and has full service facilities.



When inquiring check CP 8704 opposite last page

## Corrosives processed faster in glass-lined, conical dryer-blender

handles acids except hydrofluoric

Uses: Drying and blending corrosives and other materials.

Features: Unit can be used for all acids except hydrofluoric. It can also handle alkalis up to pH 12 and below 212°F. Glassed-steel lining resists product adherence and cuts clean-up losses and labor. Tumbling action speeds drying because it keeps exposing new surface areas from which evaporation can take place.

Description: Dryer-blender consists of a glasslined, jacketed, conical tank, rotated by a US synchrogear motor with Class II gear drive. Variable-speed



Glass-lined dryer-blender cuts drying and blending time for corrosives

drive is available if desired. Dryer withstands full vacuum, or pressures up to 20 psi. Jacket is of carbon steel and accommodates pressures up to 40 psi.

Unit is filled through 1½' diameter opening and discharged through 8" nozzle. Steam or hot water can be used for heating. Heating medium enters jacket through center of trunnion and leaves through pipes and rotary joints at top and bottom of jacket.

Dryer-blenders are available in 2, 4, 6, and 8' diameters. Normal working capacities are about 60% of total volume, but will vary from 25 to 65%, depending upon product and conditions.

(Conical glassed-steel dryer-blenders are product of The Pfaudler Company, Dept. CP, 1000 West Avenue, Rochester 4, New York . . . or for more information check CP 8705 on handy form opposite last page.)

#### Liquids up to 2000 centipoises get good mixing . . .

shaft is heavy enough to take care of side thrusts and bending stresses



er

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d-

r.

X-

n

Mixer has oilless bronze bearings

Mixing, II ses: stirring, blending, aerating, and similar operations.

Unit Features: can handle liquids up to 2000-cp viscosity. Output shaft is heavy enough to take care of side thrust and bending stresses.

Description: Pedestal and drive are of integral design. Heavy-duty anti-friction thrust bearings are widely spaced on shaft. Combination pressure-type stuffing box with oilless bronze bearing eliminates oil leakage around shaft and simplifies replacement of lower bearing. Units are available in sizes ranging from one to five horsepower. Geared or direct drives may be specified.

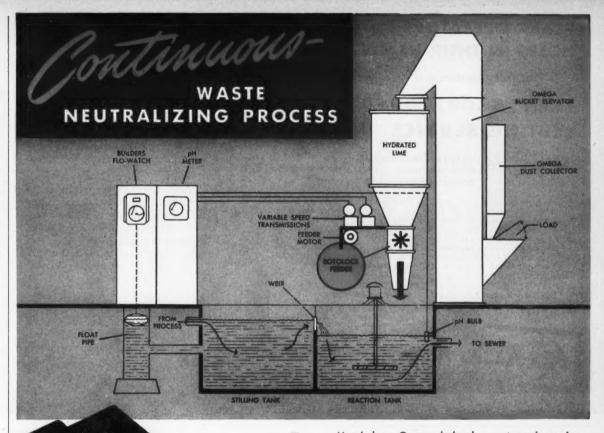
(Unimixer agitator is product of The Patterson Foundry and Machine Com-

pany, Dept. CP, 41 Helene Street, East Liverpool, Ohio . . . or for more information check CP 8706 on handy form opposite last page.)

#### Liquid-processing aids told in 32 pages

Line of stainless-steel filters, agitators, pumps, and tanks is presented in 32-page catalog. Written especially for plant personnel, it contains photos, diagrams, drawings, and descriptions of various equipment. Catalog emphasizes compactness, simplicity, and efficiency.

"Liquid Processing Equipment" is issued by Alsop Engineering Corporation, Dept. CP, 800 Alsop Street, Milldale, Conn. When inquiring specify CP 8707 on handy form opposite last page.



OMEGA ROTOLOCK DOES THE JOB

Omega Rotolock—a rotating vane feeder—feeds hydrated lime into the reaction tank in response to the flow of acid waste (measured by a Builders Flo-Watch Instrument) and to the degree of neutralization (measured by a pH meter).

The Rotolock is a volumetric feeder of simple design and rugged construction, easily adapted to installations requiring proportional pacing by auxiliary meters. The Feeder, powered by a 1/4 HP motor, has a 100 to 1 feed range. Two models of Omega Rotolock Feeders are available, covering the complete range of feeds from 7.2 to 300 cu. ft. per hr.

Here's how Omega helped a customer's engineer solve a waste treatment problem for one of the nation's leading manufacturers of electrical and electronic equipment. This acid waste neutralizing "equipment package" comprises feeding, controlling, and metering units required for continuous, accurate operation . . . Omega bucket elevator, dust collector, storage hopper, Rotolock Feeder, and Builders Instruments and Control Panel. Performance of this "package" under actual job conditions has proven again that it pays to take advantage of Omega's engineering and manufacturing experience, when you need continuous proportioning equipment.

Hundreds of today's processing and production problems are being solved by Omega "packages" - for waste treatment, for proportioning two or more solids, for proportioning liquids and solids. Send for Bulletin 45-H8 describing Omega Rotolock Volumetric Feeders, or tell us about your waste treatment or process problems. Omega Machine Co., 387 Harris Ave., Providence 1, R. I.

## EGATHE LAST FEEDERS

DIVISION OF B-I-F INDUSTRIES, INC.
BUILDERS IRON FOUNDRY . PROPORTIONEERS, INC. BUILDERS . PROVIDENCE, INC.



When inquiring check CP 8708 opposite last page

G

#### PLANT OPERATORS WITH HOLES IN THEIR HEADS

usually ignore our

#### FREE LABORATORY TESTING SERVICE

But you will quickly realize it may show you a valuable new method of processing in the Unit Operations of "Size Reduction" and "Mixing."

For help in solving your prob-lems, send us samples. In our Laboratory we use Rietz Disinte-grators and Rietz Prebreakers plus our experience to reach an answer for you through research. You'll get a full report complete with samples. And we'll pick up the check.

If Rietz equipment does a better job of meeting your specifica-tions, we'll hope to sell you some or install it in your plant on our rental-trial plan. If it does not do a better job, we've all learned something and you're out nothing except some samples.

B-U-T...you won't know and we won't know, unless you let us try.

RIETZ MFG. CO. SALES AND SERVICE MIDWEST: 217 West Main Street, St. Charles, Illinois EAST: 1969 Bartle Avenue, Scotch Plains, New Jersey SOUTH: Forsyth Building, Atlanta, Georgia SOUTHWEST: 1213 Capitol Avenue, Houston, Texas

MANUFACTURING CO.

Santa Rosa, California

When inquiring check CP 8709 opposite last page

## Why It PAYS to Us Shriver



- You can recover solids or clarify at any desired pressure and temperature.
- Use any filter media and filter aids.
- Filter cake can be thoroughly washed and extracted.
- Uniform cake of any desired thickness easily removable.
- Unfiltered residue can easily be blown out, dried, redissolved or melted in the press.

Catalog 55 presents the economy advantages of Shriver Filter Presses. Write for

#### T. SHRIVER & COMPANY, Inc.

Filter Presses + Filter Media + Diaphragm Pumps

846 Hamilton St., Harrison, N. J.

Sales Representatives in Decatur, Ga.-Houston, Tex.-St. Louis, Mo.
San Francisco-Montreal-Toronto

When inquiring check CP 8710 opposite last page

#### **PROCESSING**

Automatic reflux head improves column operation . . .

> eliminates need for reflux rotameter and return line

Uses: For automatically controlling reflux ratio on distillation columns.

Features: Device can be set for reflux ratio of 0.1:1 to 100:1. Mounted on top of column, controller eliminates need for reflux rotameter and return line. Reflux is returned to column at boiling point, eliminating heat losses, and increasing efficiency of column.

Description: Automatic reflux heads can be used with any kind of condenser arrangement. Units operate under vacuum, high temperatures, or corrosive conditions.

Device fits on top of column (before condenser) and is controlled by timer located on column's control panel. Selected reflux ratio is maintained even though distilla-



Automatic reflux head fits on top of column below condenser, can be set for reflux ratios of 0.1:1 to 100:1

tion conditions vary. Interior consists of tilting-funnel arrangement which accurately splits the liquid flow and returns proper amount as reflux. Electrically-operated mechanism has corrosion-resistant self-lubricating bearings.

Heads are available in standard

efecturers of Processing Euclipment Since 1885

Impact—Shear—Compression Action SINGLE ROLL CRUSHERS



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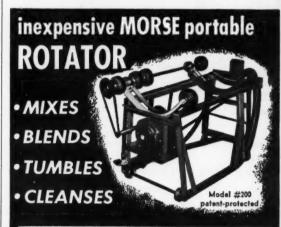
Used as a Primary Crusher or as a Combination Crusher and Feeder, controlling flow to Secondary Units.

Wet, frozen or sticky material of semihard or friable nature, uniformly crushed with ease. Geared for Power, rolls may be obtained with manganese alloy CONE TEETH, SLUGGER TEETH, or SPLITTING TEETH for handling special ores and raw chemicals. Also Special Built Machines.

WRITE FOR ILLUSTRATED BULLETIN No. 702

CRUSHER & PULVERIZER CO. 2915 North Market St., Dept. CP8, St. Louis 6, Mo.

When inquiring check CP 8711 opposite last page



In 30 to 55 gal. drums, 1 to 5 gal. cans at rotating speeds 10 to 40 rpm. The four drive-wheels have Neoprene treads, resistant to paint and oil. The idler wheels have Torrington Needle Bearings for smoother operation, Easily loaded—frame has retractable casters. Various speeds are secured through chain sprocket reduction. Morse Model #200 Rotator weighs 115 lb. Write for Bulletin 348 and free folder showing complete Morse line or Drum and Barrel Handling Equipment.

## 757 West Monlius St. East Syrocuse, N

When inquiring check CP 8712 opposite last page

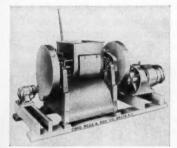
#### **PROCESSING**

sizes from 2" to 36" diameter. Construction is of carbon steel with internal mechanism stainless steel. (Automatic reflux heads are product of Distillation Engineering Company, Dept. CP, 105 Dorsa Avenue, Livingston, New Jersey. Check CP 8713 opp. last page.)

## Difficult materials handled easily by heavy-duty kneaders . . .

close clearances between arms, trough give maximum shear

Uses: Double-arm machines are built specifically for intensive mixing or kneading of heavy plastic masses and similar materials.



Heavy-duty 25-gal double-arm kneader has 25-hp motor

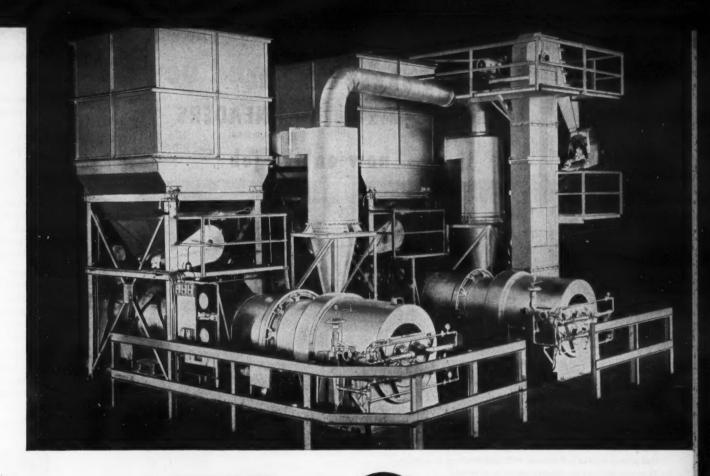
Features: Rugged construction provides smooth operation. Close clearances between mixing arms and trough result in maximum dispersion and shear.

Description: Double-arm kneaders are available in various sizes ranging in working capacity from one pint to 150 gallons. Arms can be operated when unit is in tilted position to facilitate discharge.

(Heavy-duty double-arm kneaders are product of Charles Ross and Son Company, Dept. CP, 148-156 Classon Avenue, Brooklyn 5, New York . . . or for more information check CP 8714 opposite last page.)

For more information on product at right, specify CP 8715
. . . see information request blank opposite last page.





## compact Twin Dryer installation



Calciner and Cooler for Continuous Process-Ing at Temperatures from 900° F. to 2100° F.



Special Stainless Steel Batch Dryer for Drying Fine Catalyst without Dust Loss.

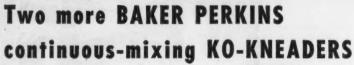
Two completely self contained duplicate systems can be operated either singly — or together — assuring efficient production regardless of wide fluctuations in plant requirements.

• These dryers maintain maximum fuel economy and discharge material of uniform dryness despite variations in the moisture content of the feed. Highly efficient, the installation is another example of Bartlett-Snow's skillful, detailed approach to every drying problem—your assurance that the equipment furnished will be exactly suited to your particular requirement. Let us work with you on your mext job.



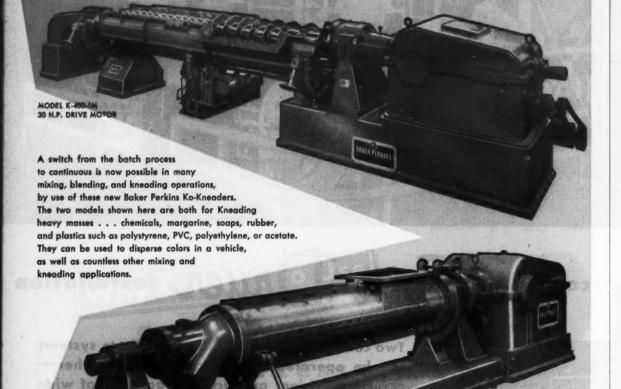
Dryers • Coolers • Calciners • Kilns
"Builders of Equipment for People You Know"

G



(LIST SYSTEM)

now on the job



In many phases of the chemical industry the mixing process has been a bottleneck because it was a batch operation. The Baker Perkins Ko-Kneaders break this bottleneck by converting to continuous mixing. When installed with the proper feeding and output handling equipment, these Ko-Kneaders make mixing largely automatic, and result in a better quality product along with savings in production costs.

BAKER PERKINS INC.

103

MODEL K-300-IM

CHEMICAL MACHINERY DIVISION . SAGINAW, MICHIGAN

When inquiring check CP 8716 opposite last page

#### PROCESSING

Improved design ups capacity of cane juice clarifier . . .

has 30% less volume than conventional units of equal working capacity

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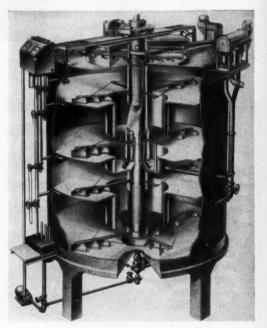
AUGI

Uses: Clarifying cane juice.

Features: Unit is designed with 30% less volume than conventional units having same working capacity. Capacity is increased due to improved feeding method and to greater spacing betwen trays. Mudthickening capacity is doubled by designing unit with two thickening chambers.

Description: Clarifier consists of cylindrical steel tank, interior of which is divided into an upper and lower section separated by a seal. Each section, in turn, consists of two compartments formed by horizontal steel trays. Lower compartment in each section acts as mud-thickening chamber.

Juice enters feed chamber at top of unit and passes down a central, hollow, rotating tube (to which mudraking mechanisms are also attached), extending down through the sections. Tube is divided vertically



Interior design of cane juice clarifier

to insure equal feed distribution to both sections. In each section, juice is flocculated in a large-diameter cylindrical feedwell. It then flows out evenly to the compartments where it is clarified.

Overflow from the four compartments is accurately controlled by flow metering weirs. Mud is withdrawn from the two mud chambers independently.

Manufacturer states that 30% volume reduction of clarifier, over conventional units handling same flow with comparable results, substantially reduces investment cost. In addition, savings are reported in freight charges and installation costs. Conventional units may be converted to double their capacity with relatively small increase in tank volume.

(Rapidorr cane juice clarifier is product of Dorr-Oliver Incorporated, Dept. CP, Barry Place, Stamford, Conn. . . . or for more information reader may simply check CP 8717 on the convenient Reader Service slip located opposite last page.)

### Almost 100% sulfur utilization in H<sub>2</sub>S generator . . .

its

th

n

at least 95% of hydrogen converted to hydrogen sulfide

Uses: Generating hydrogen sulfide for chemical, metallurgical, and other uses.

Features: Conversions of 95% or higher of hydrogen to hydrogen sulfide are obtained — final purity depending in part on purity of feed hydrogen. Sulfur utilization approaches 100%, only loss being small blowdown for ash removal.

Description: Generators are designed for continuous operation and require hydrogen at 80 psi. Solid sulfur is charged to unit intermittently. Process comprises continuous reaction of hydrogen with sulfur at elevated temperature and pressure, recovery of heat of reaction by heat exchange, and final sulfur removal from hydrogen sulfide by cooling to the point where sulfur vapors are frozen out in alternating exchangers.

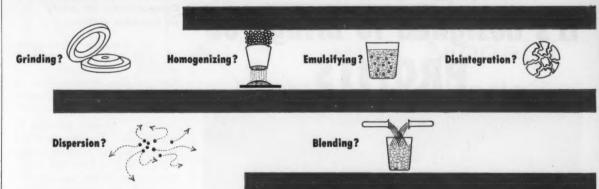
Hydrogen sulfide is delivered at 70 psi. Equipment includes sulfur melter (steam coil), liquid sulfur feed and circulating pump, reaction chamber with provisions for heat exchange, hydrogen sulfide coolers, and instruments and controls. For smaller units (1000 to 5000 lb/24 hr), an electric heater is installed in reaction vessel for startup purposes (this is particularly useful if generator is to be shut down intermittently and it is desirable to keep it hot).

Larger units include startup heaters which use gas or oil for preheating hydrogen feed gas. These are designed for continuous operation, although output may be varied over wide range.

Utility requirements include 100-psi steam, 80°F or lower cooling water, and electric power. Smaller units are shop-assembled and skid-mounted. They can be bolted to floor or concrete slab and connected to necessary utility and process lines.

(Hydrogen sulfide generators are product of The Girdler Company, A Division of National Cylinder Gas Company, Dept. CP, 224 East Broadway, Louisville 1, Kentucky . . . or for more information check CP 8718 on handy form which is located opposite last page.)

## Do you have one of these problems?



If you do... Morehouse Mills will increase your

production...give you smoother, finer, more uniform products...at less cost

Modern Morehouse Mills...proved by years of development and plant operation... solve these problems for you either separately or concurrently.

Each Morehouse Mill features the Morehouse principle of vertical milling by means of high-speed noncontaminating revolving "CARBO-RUNDUM" stones. The models differ only in capacity, application, horsepower, speed, adjustment features and auxiliary equipment. But these differences are the things that permit a specific Morehouse Mill to solve your specific processing problem.

Used today to process over 100 products in more than 50 countries. Regardless of the frequency, voltage or phase of the electrical current in the area where you operate, there is a Morehouse Mill to meet your needs.



## And . . . for ultimate dispersion

The high-speed Cowles Dissolver is 2 to 20 times faster than conventional mixers!

Saves space, laborand maintenance costs. Versatile. Engineered to meet your exact requirements. Fully guaranteed. Many models.



## write or send coupon today!

Originators of high-speed stone milling equipment and sole manufacturers of Morehouse Milli Since 1898

Morehouse-Cowles, Inc., 1150 San Fernando Rd., Los Angeles 65, Calif., Cable Address: "MORESPEED," Los Angeles Please send complete information on 

Cowles Dissolvers.

I manufacture	
Name	
Company Name	
Address	
City	Country

Capacities from 160 to 7500 gallons per 8-hr. day!

¡Atención! Tenemos disponible literatura en una variedad de idiomas. Escríbanos en su propio idioma. Purchase of Morehouse Equipment is being approved by many governments because of their contributions to the economy of the country

COMPACT AND LIGHTWEIGHT MOREHOUSE
MILLS PROCESS FLOWABLE PRODUCTS SUCH
AS: Paints • Foods • Chemicals • Greases
• Ceramics • Inks • Pharmaceuticals

OFFERING YOU ... Low first cost • Desired adjustment without stopping • Easy duplication of desired end-product • No contamination • Easy cleaning and low-cost maintenance

When inquiring check CP 8719 opposite last page

# If it's PROCTOR it's designed to bring you PROFITS



Proctor Tunnel Truck Dryers have long been standard in the chemical and process industries for efficient, continuous drying of materials, which by their size, density, or composition require prolonged drying times or conditioning periods. Now an entirely new type of housing construction offers added advantages in terms of speed of erection and smoother, easier-to-clean interiors. Latest temperature, humidity, and air circulation controls assure flexibility of operation, while improvements in the air circulation system result in new uniformity of air distribution, and better drying.

Proctor engineers are backed by a record of more successful drying installations than any other company in the world...they will be glad to recommend equipment best suited to your needs.

Write for information bulletins on the following Proctor Drying Equipment

Tray Dryers
 Continuous Conveyor Systems

Pre-forming FeedsSpray Dryers



#### PROCTOR & SCHWARTZ, Inc.

Manufacturers of Industrial Drying Equipment and Textile Machinery • Philadelphia 20, Pa.

When inquiring check CP 8720 opposite last page

**PROCESSING** 

Compact filter fits easily on movable platform . . .

can be used at various points throughout plant

Uses: For filtrations down to 1/10 micron in chemical, pharmaceutical, and food plants.

Features: Compact filter may be mounted on movable platform and used at various filtration points throughout plant. Unit uses porous stone, porous carbon, stainless steel wire-mesh, or other filter media. Backwash device speeds cleaning and prevents spillage.

Description: Unit consists of pre-coating tank, splash-proof electric motor, pump, filter pressure



Closed-type pressure filter uses porous stone, porous carbon, or other filter media

chamber, valves, and pressure gage. Filters are designed for pressures to 125 psi and flow rates of 300 gpm and up.

Stainless steel wire-wound cylinders support filter media in pressure chamber. Cylinders are attached directly to filter head and eliminate need for cloths, pads, or bags. Filter media can be quickly interchanged. Backwashing is accomplished just by turning two valves. Cleaning and pre-coating take less than nine minutes.

(Hoffman-Hygrade pressure filters are product of Industrial Equipment Division, United States Hoffman Machinery Corporation, 105 Fourth Avenue, New York 3, N. Y. . . . or for more information reader may check CP 8721 on handy form which is located opposite last page.)

OPERATES IN SECONDS!

DELIVERS YEARS OF

MORE EFFICIENT FILTRATION!

SPERRY
"HANDRAULIC"
FILTER PRESS
CLOSING DEVICE



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Replaces the filler block . . . without alterations or extra space . . . to provide the speed and ease of hydraulic control in a low-cost manually-operated Closing Device. It's the newest member in Sperry's family of custom-engineered Filter Presses and auxiliary equipment. See the complete line in Sperry's big new catalog. Send for your free copy today.

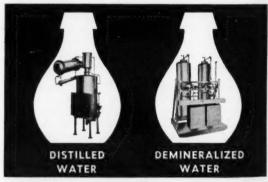
Eastern Sales Representative: George S. Tarbox, 808 Nepperhan Ave. Yonkers 3, N. Y.

Western Sales Representative: B. M. Pilhashy, 833 Merchants Exch Bidg., San Francisc 4, Calif. DO 2-037

SPERRY

D. R. SPERRY & CO., BATAVIA, ILL.

When inquiring check CP 8722 opposite last page



### Which Do You Need?

Barnstead Stills remove from the water all impurities; ionizable and non-ionizable including silica, organic gases and bacteria. 75 years of Barnstead Pure-Water Experience ... over 60,000 Barnstead installations throughout the world ... guarantee a tailormade solution to your Pure Water Problem! Write for free consultation. Barnstead Demineralizers produce mineral free water at a substantially lower operating cost. Here the removal of only ionizable impurities is required, demineralization is the answer. Barnstead Demineralizers in capacities of 5 gallons to 1,000 gallons per hour produce demineralized water for as little as 5c per thousand gallons.

WRITE FOR BARNSTEAD PURE WATER BULLETINS TODAY.

N. Y. Office KIngsbridge 8-1557



66 Lanesville Terrace, Boston, Mass.

When inquiring check CP 8723 opposite last page

"Air screen" separates, classifies granular products without use of wire-mesh screen . . .

controlled air flow carries lighter particles up and away from heavier ones

Uses: Intended primarily for classifying fine-sieve and sub-sieve particles and for removing fine particles from coarse, granular material.

Features: Separates and classifies particles into almost any micron size without wire-mesh screens.

Description: Material being processed is discharged into hopper

from which it is picked up by suction nozzle. Product is carried up by vertical air stream past deflectors and material diverting passages. Air flow is carefully controlled so that particles in excess of selected weight and size settle out and collect at bottom of chamber. Lighter particles are carried up and away for product recovery, or whatever use process may call for.

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Laboratory model 'air screen' is 8 ft tall, can handle 500 lb/hr when screening to 200 mesh

of fines required to pass the "screen". Air flow is in most cases produced by a single-stage centrifugal fan. Special cases may require use of multi-stage centrifugal blowers or positive rotary blowers.

As with a pneumatic conveyor, "screen" can be operated either as suction or pressure system. Unit can be operated continuously if provided with an air-lock to discharge the retained coarser material. Laboratory model has 8' overall height and is capable of handling 500 pounds per hour when screening to 200 mesh (74 microns).

("Air Screen" is product of Airborne Conveyors Corporation, Dept. CP, 99 Hudson Street, New York 13, N.Y. Check CP 8724 opposite last page.)

For a guide to processing ideas . . .

You'll find what you need in the handy Product Directory on pages 210 to 212. All products and processes are listed there.



Then Save Time and Money with

## THE LIXATE PROCESS

In a single piece of equipment, The Lixate Process combines a method of dissolving rock salt without agitation and a method of filtration.

#### MAKES BRINE AUTOMATICALLY

The Lixator makes and filters all the brine you want or need with no human aid whatever and can be located *anywhere*—even hundreds of yards from buildings and points of use.

#### UNIFORM QUALITY AND STRENGTH

The Lixator produces only 100% fully-saturated brine, self-filtered, crystal clear. May be accurately reduced in strength, without testing, without delays.

#### PIPED TO POINTS OF USE

Turn a tap, there's your brine—where you want it, when you want it. No handling of salt or finished brine. Economy! Convenience! Efficiency! All Lixator installations are custom-engineered.

#### EVAPORATED SALT DISSOLVERS, TOO

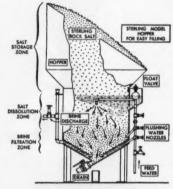
Rock Salt or Evaporated Salt—International provides both in all forms. It provides also any technical advice on salt, brine, or auxiliary equipment, required by users, for either kind of salt.

#### INTERNATIONAL SALT COMPANY, Inc.

Scranton, Pa.

SALES OFFICES: Atlanta, Ga. • Chicago, Ill. • New Orleans, La. • Baltimore, Md. • Boston, Mass. • Detroit, Mich. • St. Louis, Mo. • Newark, N. J. • Buffalo, N. Y. New York, N. Y. • Cincinnati, O. • Cleveland, O. • Philadelphia, Pa. • Pittsburgh, Pa. • Richmond, Va.

ENGINEERING OFFICES: Atlanta • Buffalo • Chicago



#### HOW LIXATOR WORKS

Rock Salt, fed by gravity, keeps tank filled. Water in dissolution zone dissolves salt, becomes 100% saturated brine. Lower bed of rock salt acts as filter. Result—crystal clear, fully saturated brine.

It costs nothing to find out what The Lixate Process can do in YOUR plant! SEND THIS COUPON NOW!

International Salt Co., Inc. Industrial Division, Scranton 2, Pa.

Without obligation, please have an International Industrial Engineer call to show me how The Lixate Process might be adapted to my plant.

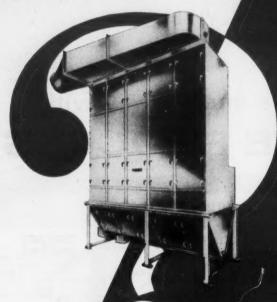
Name	Title		
Firm Name			
Address			
City	Zone	State	

When inquiring check CP 8725 opposite last page

## "DO-IT-YOURSELF" or "TURN-KEY" job???

an ENTOLETER DIVISION designed system solves dust collection problems either way . . .

Our engineering staff will specify the Simon Suction Filter Dust Collector to meet your requirements.....ship you the parts and installation instructions and you can "DO-IT-YOURSELF"! All parts are jig-drilled and tapped to facilitate assembly... or dismantling should future requirements dictate its relocation.



OR.

SIMON SUCTION FILTER DUST COLLECTOR

IT IS YOUR

BEST BUY IN DUST COLLECTING EQUIPMENT!

#### ENTOLETER DIVISION

The Safety Car Heating & Lighting Company, Inc. 1187 Dixwell Ave., New Haven 4, Connecticut

When inquiring check CP 8726 opposite last page

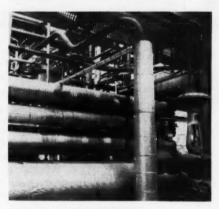
## engineering and maintenance



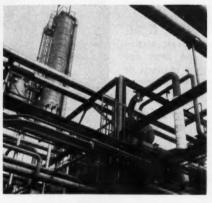
Section of National Petro-Chemical's plant at Tuscola, III.

National Petro-Chemicals Corp. plant uses aluminum jacketing to . . .

# prolong life of high and low temperature insulated lines



Jacketing is in service in refrigeration compressor area of the plant



Tower in ethylene plant uses 0.016" jacketing and straps to protect it against weather



Stripper units in extraction plant show how jacketing preserves appearance, affords protection



Insulation jacketing is in use at ethylene plant in refrigeration area



Aluminum jacketing gives slender fractionating columns a clean looking appearance

#### eliminates need for repainting pipe, is easy to install, and enhances appearance of plant

At the National Petro-Chemicals plant at Tuscola, Illinois, both high- and low-temperature lines are protected from weathering by lightweight aluminum jacketing. This jacketing is used on pipes, vessels, and towers containing materials at temperatures from -15 to 1500°F. Not only does the jacketing do a good job protecting the foam glass, Kaylo and Thermobestos insulation, but it also gives the plant a brighter appearance.

About 300,000 square feet of the jacketing is presently at use at the plant. Sheets .006" in thickness are used on most of the pipes. A heavier .016" thick sheet is used on most of the towers, vessels, and tanks and on lines along walkways where jacketing would be subject to abuse. Aluminum strapping and metal screws are used in attaching the jacketing. The screws are used mostly indoors where appearance is more important. The aluminum strapping is used on most of the outdoor applications.

To add vertical strength, help avoid denting, and reduce glare, the jacketing has a 3/16" crimping across the sheet. Where specified, a Kraft paper moisture barrier impregnated with asphaltic compounds and coated with sealing mixture of gilsonite, resins, waxes, and more asphalt has been bonded to the aluminum.

Normally the jacket comes in sheets on rolls four feet in width and 200 feet long. When moisture barrier is added to jacketing the rolls are 100 feet long.

Cutting the insulation jacketing on the job requires only straightedge and dull knife. Straps are applied with pliers and screwdriver.

Jacketing requires no painting and can be easily washed with water.

(Jacketing is a product of Childers Mfg. Co., Dept. CP, 3620 W. 11th St., P. O. Box 7447, Houston 8, Texas . . . or for more information check CP 8727 on handy form opposite last page.)

## Are you paying for QUALITY? Are you getting QUALITY? THE QUALITY LINE IN STAINLESS STEEL FITTINGS



When you specify CAMCO on your stainless steel fitting requirements you are specifying QUALITY — without paying a premium. These fittings are priced in line with competition. How do we do it? CAMCO concentrates ALL of its facilities, efforts and thinking to the manufacture of stainless steel fittings only. The resulting economies are translated into quality and passed on to you.

FLANGES: Manufactured to both the ASA and MSS standards covering stainless steel flanges. All flanges to ASA specifications are DROP FORGED and are permanently marked with size, pressure rating, material identification, trademark, and heat numbers—(the key to certificates of analysis and corrosion coupons when required). All flanges to MSS standards are machined from DROP FORGINGS to 4" IPS, (Weldneck flanges to 1" IPS only) and from sound costings in sizes 5" IPS and higher.

SCREWED FITTINGS: All ells and tees to 34" IPS inclusive and all cylindrical fittings to 2" IPS inclusive (caps, couplings, plugs, bushings and unions) are manufactured from DROP FORGINGS in our 150 lb. line of fittings. Independent outside tests have indicated that these fittings can be rated 1000 lb. CWP. Fittings in higher sizes of our 150 lb. line are machined from sound castings.

AVAILABILITY: Sold and stocked by distributors throughout the country and backed by large stocks at the plant for requirements in excess of normal.

Use attached coupon for Flange Dimen- sional Slide Rule and Catalog covering com- plete line.	CAMCO Products, Inc., 445 State Street, North Haven, Conn.  Gentlemen:  Please send Flange Dimensional Slide Rule.  CP  Catalog #653 covering complete line.  Furnish address of area distributor.  Put us on your mailing list to receive your stock list.
MAIL TODAY 4	Name
17.4	Company
	Address
	City and State
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When inquiring check CP 8728 opposite last page



## Step up your processing

#### ... with these FLINTKOTE products

Today, in volume bonding, laminating, impregnating or similar operations, lower costs are often possible with bulk supplied Flintkote Industrial Adhesives . . .

#### **Rubber and Resin Latex Compounds**

Great versatility in various formulations of rubber and resin bases with papers and cloth materials. For adhering, flexibilizing, binding.

#### **Reclaim Rubber Dispersions**

Several high test, low cost, not flammable water base adhesives offering wide range in viscosity, open and setting times. You can also use them to extend higher cost, new rubber latices for manufacturing economy.

#### **Asphaltic Compounds**

Emulsions and cutbacks for adhering, saturating or sizing many fibrous products: felts, insulation, fabrics,

paper. You can obtain internal or external water resistance. Also asphalts compounded with rubber and asphalts for extending latices.

#### **Rubber-Resin Solvent Cements**

Formulations for multi-purpose bonding of rubber, metal, wood, plastics, leather, glass, fabrics to themselves or one another. Designed for various application methods and systems.

Let's discuss the possibilities of these adhesives for your processing problems, or ask for technical data sheets. Our 50 years specialized experience is at your service.

#### THE FLINTKOTE COMPANY

Industrial Products Division, 30 Rockefeller Plaza, New York 20, N. Y.

Boston • Chicago Heights • Detroit • Los Angeles • New Orleans • Philadelphia In Toronto, Ontario: The Flintkote Company of Canada, Ltd.

In London, England: Industrial Asphalts Company, Ltd.

## FLINTKOTE Products for Industry



When inquiring check CP 8729 opposite last page .

#### **ENGINEERING & MAINTENANCE**

Fast water-heating control featured on single-temp control unit . . .

> provides constant, proper heat for molding and vacuum forming



Compact temperature controller offers space-saving advantages

Uses: For applications where an accurate, automaticallycontrolled temperature between 60 and 210°F is desired. Unit is now in use where a single, stabilized water temperature is necessary in injection molding and vacuum forming operations in the plastics industry.

Features: In operation unit gives fast-reacting waterheating control through use of modulating valve. It has low water capacity (5 to 9 gpm circulating, depending on hose length) and high water velocity.

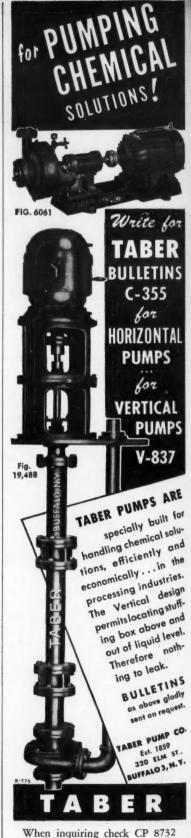
Single temperature control unit is Description: compact, and while it normally operates in a vertical position, it is designed to operate just as efficiently in four horizontal positions. For applications where more than a single temperature is required, unit can be arranged in multiples.

(Sterlco 6012 single temperature control unit is a product of Sterling, Inc., Dept. CP, 3738 N. Holton St., Milwaukee, Wis. . . . or for more information check CP 8730 opposite last page.)

#### Covers carbon steel tubing for heat exchangers

Brochure of twelve pages covers carbon steel tubing for heat exchangers and condensers. A typical specification, ASTM A-214, covering this grade of tubing, has been broken down paragraph by paragraph to show how tubing is processed to meet each requirement in specification. Photos show various production operations in accordance with specification.

Brochure HEC-1 is available from Steel and Tubes Division, Republic Steel Corporation, Dept. CP, 224 East 131st St., Cleveland 8, Ohio. Specify CP 8731 opposite last page.



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When inquiring check CP 8732 opposite last page

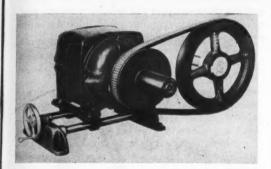
CHEMICAL PROCESSING

Finger-tip control changes speed of machinery while it's in motion . . .

variable-speed pulley provides ratios to 3:1 at  $7\frac{1}{2}$  to 15 hp

Uses: Installation on new or old equipment requiring easily-controlled, variable-speed pulleys.

Features: Pulley provides ratios to 3:1 at 7½ to 15 hp. It changes speed at finger-tip pressure while machinery is in motion.



Description: Used in conjunction with 1750-rpm motor, maximum horsepower is 10 with the #310 base and 15 with the #315 base. The 1150-rpm motor affords 7½ hp with the #310 base and 10 hp with the #315 base.

Belt accommodated is company's No. 27 23/4" top width variable-speed belt. Standard bores are 11/4", 13/8", 15/8". Other specifications include 13.1 max and 4.35 min pitch diameter, length of bore 33/4" and max bore 15/8".

(Variable-speed pulley is a product of Lovejoy Flexible Coupling Co., Dept. CP, 4872 W. Lake St., Chicago 44, Ill. . . . or for more information check CP 8733 on handy form opposite last page.)

## Application of AC motors, controls to centrifugal compressors

Characteristics of AC motors and controls as they are applied to centrifugal compressors are discussed in 10-page illustrated publication. Highlights of synchronous motor and induction motor torque requirements for centrifugal compressors and hints on selection of motor are covered. Diagrams, charts, graphs, and formulas valuable in application problems are presented.

Publication 1120 is available from Electric Machinery Mfg. Co., Dept. CP, 1131 Tyler St., N.E., Minneapolis 13, Minn. When inquiring specify CP 8734 on handy form opposite last page.

Armstrong Unit Trapping
—Low Cost Insurance
of a Big Investment

• 30% more production from kettles... 84 degrees higher dryer temperatures... 8% more output from dry kiln—these are typical results of unit trapping with Armstrongs.

What about your plant? It doesn't make good business sense to spend \$500, \$5000 or \$50,000 for equipment and then lose 10% to 30% or more of its productivity for lack of proper trapping.

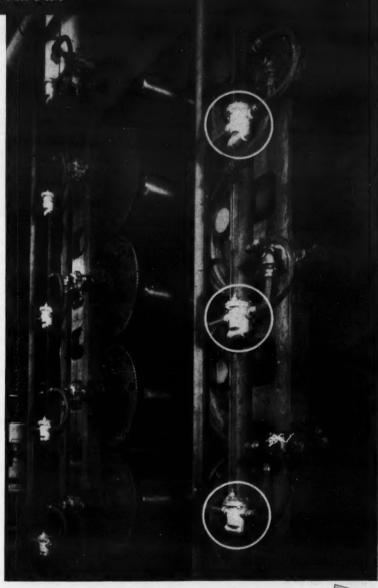
Armstrong traps are "application engineered" by men who know trapping thoroughly—how to size traps for fast heat-up and top temperatures ... correct installation practice ... steam supply and return line requirements ... variable pressure problems ... mysterious difficulties. The cost of retrapping with Armstrongs is usually but a fraction of 1% of the cost of the equipment drained — low cost insurance of a big investment!

Call your Armstrong Representative today. He sells on a basis of "satisfaction or your money back." Or, write:

ARMSTRONG MACHINE WORKS 880 Maple St., Three Rivers, Mich.



Armstrong built-in strainer traps, pictured on textile dry cans at the right, cost less to buy and install than standard traps and separate strainers—they reduce maintenance and costly shutdowns. Three sizes, ½° or ¾° connections.



#### SEND FOR FREE STEAM TRAP BOOK ...

... 44 pages of how-to-do-it data. Useful and educational. Free on request without obligation.



ARMSTRONG STEAM TRAPS

When inquiring check CP 8735 opposite last page

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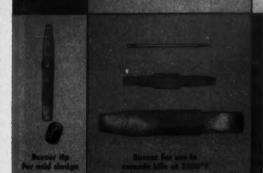


# SUPER REFRACTORY has METAL-LIKE PROPERTIES up to 3000° F









The refractory parts you see above are made of REFRAX® silicon-nitride-bonded silicon carbide. CARBORUNDUM has developed it to fill the need for a material that can be formed into intricate parts with metal-like properties for use at temperatures far above the melting points of the most expensive alloys.

Prices are practical. Since REFRAX parts are supplied in ready-to-use shapes, they are usually far less expensive than high-temperature alloys. In one case, REFRAX brazing fixtures cost only 1/15 as much as the alloy they replaced and gave better than 150 trips without deformation whereas the alloy fixtures needed frequent straightening and refinishing.

Here are some facts and figures that show how well REFRAX materials can answer the special requirements of complicated parts for low to high-temperature service:

#### TOLERANCES TO ± 0.005 in./in.

These materials can be produced in intricate shapes to accuracies of  $\pm$  0.005 inch per inch, with or without external or internal threads. Surface finish resembles that of a cast metal part. Unlike many metals, REFRAX shapes show little or no warpage after repeated heating and cooling cycles.

#### HIGH HOT STRENGTH

At 2450°F, REFRAX refractories have a modulus of rupture of 5600 psi. Even the best heat-resistant alloy melts below this temperature.

#### HIGH HEAT CONDUCTIVITY

The heat conductivity of REFRAX materials approaches that of chrome-nickel steels.

#### UNAFFECTED BY MOST ACIDS

The new refractory is inert to most acids at temperatures that range from moderate to extreme. It also stands up against molten slags and molten synthetic mica. Even molten aluminum leaves REFRAX shapes unharmed.

Does this new group of refractories offer a practical solution to your special problem? It's easy to find out—simply write us for full details. If you wish, describe the application you have in mind. We will be glad to advise you whether REFRAX materials will be suitable. Address Dept. S85 Refractories Division, The Carborundum Company, Perth Amboy, N. J.

#### CARBORUNDUM Registered Trade Merk

... also offers these advanced special-purpose super refractories: silicon carbide of fused aluminum oxide of electric furnace mullite of stabilized zirconia of boron nitride of boron carbide of zirconium boride of titanium boride of chromium boride of molybdenum boride of nickel aluminide.

When inquiring check CP 8736 opposite last page

#### ENGINEERING & MAINTENANCE

### Insulates all around wire joint without use of tape . . .

connector and "diaper-wrap" insulator are approved by Underwriters' Labs

Uses: For general use in branch circuits and fixture wiring.

Features: Crimp connector is made of cadmiumplated steel to insure greater holding power. It is open at both ends to allow observation of the joint.

Diaper-wrap insulator provides factory-perfect, prefabricated insulating job. Without use of tape, it insulates all around joint and between wires and provides double-thick, puncture-proof insulation over sleeve and wire ends. Joint takes little space.



Insulator is applied by pushing it down over crimped sleeve and wires then drawing tabbed cap and connecting strip through wires over end of joint in a diaper-wrap

Description: While intended primarily for use with diaper-wrap insulator, crimp connector may also be used with tape in making wire joints.

Insulator is made of same flexible vinyl material used for wire and is practically impervious to aging, corrosive atmospheres, sunlight, gasoline. It is listed for maximum temperature of 165°F and works easily at minus 10°F.

(Crimp connector and wire joint insulator are products of Ideal Industries, Inc., Dept. CP, 5073 Park Ave., Sycamore, Ill. . . or for more information check CP 8737 on handy form opposite last page.)

## Drives for belt conveyors discussed in bulletin

First in series of bi-monthly publications deals with drives for heavy-duty belt conveyors. Drive specifications are listed and typical installations are illustrated. Succeeding issues of publication will discuss other drives, their advantages, how they are applied.

"Better Drives", Volume I, is issued by W. A. Jones Foundry & Machine Co., Dept. CP, 4401 W. Roosevelt Rd., Chicago 24, Ill. When inquiring specify CP 8738 opposite last page.

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#### Data on regenerative turbine pumps

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oroover A 12-page pamphlet describing 19 models of two-stage regenerative turbine pumps contains photos, cross-section diagrams illustrating principle of operation, data on mechanical seals available, installation dimensions and performance tables of units handling both cold and hot water.

Bul 107 is available from Roy E. Roth Company, Dept. CP, 2420 4th Ave., Rock Island, Illinois. When inquiring specify CP 8739 on handy form opposite last page.

#### Removes micron-size particles from natural gas streams under pressure

Recently-introduced scrubber and filter is designed to remove micron-size particles from gas streams under pressure. Unit can replace oil-type wet gas scrubbers on natural gas distribution systems. Filter employs replaceable fiber-glass elements which will efficiently remove particles in sub-micron size ranges. It can be operated for long periods without attention.

In addition to being useful for filtering gases, unit will remove fine mist particles by coalescing them into larger particles that can be removed by means of a conventional mist eliminator furnished as integral part of filter.

(Gas filter and scrubber is a product of Perry Equipment Corporation, Dept. CP, Mineral Wells, Texas... or for more information reader may simply check CP 8740 on the convenient Reader Service slip which is located opposite last page.)

#### Economical unit marks lines for safety, traffic control on any firm surface

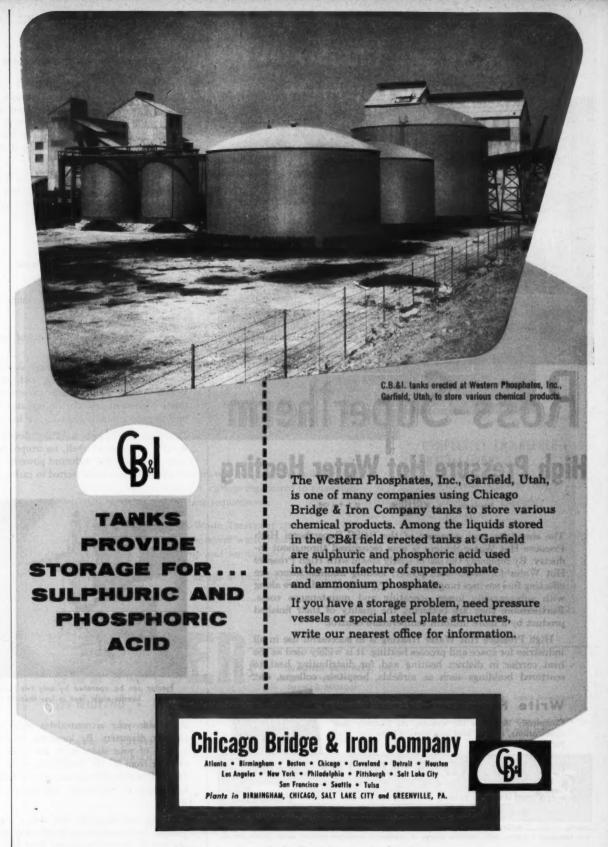
Uses: For marking lanes in plants, loading platforms, parking areas, storage rooms.

Features: Economical unit operates on spreader principle.

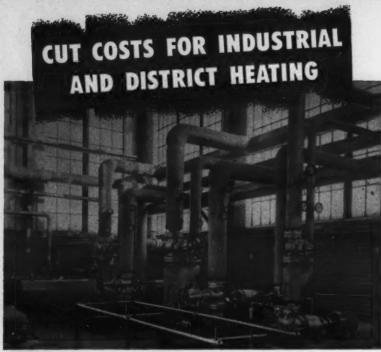
Description: Traffic line marker applies paint to any firm surface. It works close to piled material or other projections. Any kind of "zone" paint can be used.

Units are available for marking line widths of 1, 2, 3, and 4".

(Line marker is a product of Industrial Products Company, Dept. CP, 2834 N. Fourth Street, Philadelphia 33, Pa. . . . or for more information check CP 8741 on the convenient Reader Service slip which is located opposite last page.)



When inquiring check CP 8742 opposite last page



# Ross-Supertherm High Pressure Hot Water Heating

Registere



U. S. Pat. Off.

The simplicity and economy of the ROSS Supertherm High Pressure Hot Water System is now recognized throughout industry. By replacing the use of costly steam with High Pressure Hot Water for other than power, leading manufacturers are effecting fuel savings ranging from 15% to 30% and more along with substantially lower operating and maintenance costs. Furthermore they are bettering the quality of their finished product by a more uniform temperature control.

High Pressure Hot Water Heating is in successful use in all industries for space and process heating. It is widely used as the heat carrier in district heating and for distributing heat to scattered buildings such as airfields, hospitals, colleges, etc.

#### Write For This Bulletin ....

Completely describes the system, its features and applications, charts, heat loss comparisons, etc. Ask for Bulletin 300 C.



J. O. ROSS ENGINEERING

WANUFACTURERS OF AIR PROCESSING SYSTEMS

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When inquiring check CP 8743 opposite last page

#### **ENGINEERING & MAINTENANCE**

#### **Basic information on transformers**

Illustrated 100-page publication contains ratings, ASA accuracy classifications, and prices of all company's standard indoor and outdoor potential and current transformers. Listings of ratio and phase-angle tests, tables of replacement types, and mechanical and thermal data are included.

Bul GEC-1028 is available from General Electric Company, Dept. CP, One River Road, Schenectady 5, N. Y. Specify CP 8744 opp. last page.

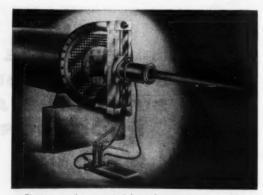
### Cuts hazards and time involved in pulling tube bundles . . .

hydraulic handling device eliminates need for "jerry-built" rigging

Uses: Removal and replacement of heat exchanger tube bundles.

Features: Hydraulic handling device eliminates need for "jerry-built" rigging and pulling beams. It also reduces safety hazards presented by conventional equipment and can be operated by only two men to push a bundle eight feet in less than 25 min.

Description: Since handling device is attached directly to exchanger shell, no temporary steel structures are required to withstand powerful thrust. None of removal force is transferred to exchanger supports.



Ejector can be operated by only two men to push a bundle eight feet in less than 25 min

Adjustable yoke accommodates wide range of exchanger diameters. By loosening two bolts, center portion of yoke slides in or out to fit any heat exchanger from 8" ID. Installation is easy. Two struts from adjustable yoke are connected directly to bonnetend flange of exchanger. Installed device supports itself

Pumping unit supplied with device consists of two pumps: one for loosening bundle, the other for moving bundle through exchanger shell. To retract piston

## Threaded Specialties

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by an exclusive method

Among Pawtucket's many specialty products are these lower-cost tee-head bolts. Pawtucket's exclusive production method keeps cost low, dimensional accuracy unusually high and strength above standard.

Pawtucket tee head belt ar made in stand.

bolts are made in standard sizes ¼" and larger, or to your specifications. In any size, you can depend on a uniform Class 3 fit, if required.

All standard steels, stainless steels and non-ferrous metals, including Titanium



BETTER BOLTS SINCE 1882

## PAWTUCKET PAWTUCKET

MANUFACTURING COMPANY
327 Pine St. - Pawtucket, R. L.
THE PLACE TO SOLVE YOUR BOLT PROBLESS

T.M. REG.

When inquiring check CP 8745 opposite last page

CHEMICAL PROCESSING

of jack at conclusion of its forward stroke, mere reversal of selector valve handle on pump base directs hydraulic fluid to opposite side of jack piston for quick return.

Heat exchanger tube bundle ejector is available as a complete packaged unit, including pump, hose, adjustable yoke, ram, tie rods, cable and all other necessary equipment.

(Hydro-ejector is a product of The M. W. Kellogg Company, sub. of Pullman, Inc., Dept. CP, P. O. Box 469, Jersey City 3, N. J. . . . or for more information reader may simply check CP 8746 on the convenient Reader Service slip which is located opposite last page.)

### Gaskets add durability to design of small steel gate valves

Small steel gate valves, in all sizes up to and including 2", incorporate gaskets made by the Flexitallic Gasket Company of Camden, N.J. These durable gaskets have been coupled with a special valve joint design. Gasket compression is accurately controlled by holding close tolerances on both recess and bonnet raised face. It is impossible to exert too much pressure on gasket itself, and long life of gasket joint for valves is assured.

Valves also have forged-steel handwheels, stainless eye bolts and nuts, two-piece flange and follower, and hard chrome-plated gates.

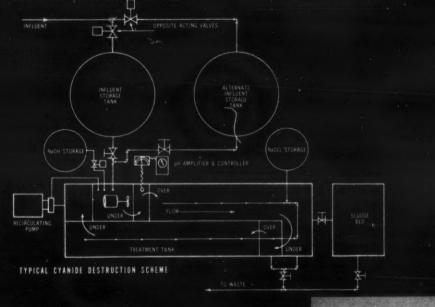
(Small steel gate valves are manufactured by Worcester Forged Steel Valve Company, Dept. CP, 16 Parker, Worcester, Mass. . . . or for more information check CP 8747 opposite last page.)



#### Your guide to more ideas concerning Engineering and Maintenance . . .

is the handy Product Directory on pages 210 to 212. All products and services discussed in this issue, in either editorial or advertising, are listed there.

## INDUSTRIAL WASTE TREATMENT SYSTEMS CUSTOM ENGINEERED BY WAGNER BROTHERS



Wagner Brothers' engineers will design and install any type of waste treatment system, custom engineered to accommodate your particular plant requirements.

With Wagner Brothers Waste Treatment systems, you can be sure of positive, economical waste treatment requiring a minimum of operating and maintenance cost.

Write now, giving full details of your waste problems.

## COMPLETELY ENGINEERED INSTALLATIONS FOR:

- · CYANIDE DESTRUCTION
- CHROMIUM RECOVERY OR DISPOSAL
- OIL EMULSION SPLITTING
- JON EXCHANGE

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CHICAGO . ROCHESTER . CLEVELAND CINCINNATI . INDIANAPOLIS . NEW YORK WAGNER BROTHERS, INC.

20 Midland Ave.

Detroit 3, Michigan

- Please have representative call to discuss our waste treatment
- We are briefly describing our present waste treatment problem

on the attached sheet. Please recommend the best method of processing.

NAME\_\_\_\_\_TITLE\_\_\_\_

ADDRESS ZONE STATE

When inquiring check CP 8748 opposite last page

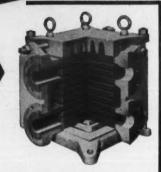
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## ONLY SIMBERUIL Gives You All Basic Designs Of IMPERVIOUS GRAPHITE **HEAT EXCHANGERS**

#### CUBICAL

Provides greatest amount of transfer surface known for size of exchanger (Example: Model 4 uses 15" cube for 100 sq. ft. effective transfer surface.) IMPERVITE CUBICAL is exceptionally rugged in con-struction, resists mechanical shock, and can be operated at pressures as high as



#### TUBE AND SHELL

You get guick shipment on famous standard IMPERVITE tube and shell exchangers in sizes from 7 to 241 tubes. Unusually flexible design and production facilities enable custom units to be fabricated quickly and economically for practically any application.

Exchangers shown are also produced from GRAPH-I-TITE, the amazing carbon-impregnated graphite which provides greater chemical resistance and withstands operating tempera-tures up to 5700° F.



#### CROSSBORE

This design is an exclusive Falls' development! It withstands operating pressures up to 200 psi, resists steam hammer and is exceptionally easy



#### CASCADE

All models utilize specially constructed low-pressure-drop ells. All tubing is extruded by an improved method which practically eliminates spalling at high temperatures and results in more uniform heat transfer characteristics.

#### WRITE FOR CATALOGS

Falls Industries produces all of its own equipment and assumes complete and undivided responsibility for its design, fabrication and operation.



31909 AURORA ROAD . SOLON, OHIO PHONE: CH. 8-5357 . TELETYPE NO: Solon 0-720

When inquiring check CP 8749 opposite last page

#### ENGINEERING

Shallower endplates cut fractional-hp motor length . . .

> units need no ventilating slots in heavy steel frame

Uses: For applications calling for motors of 1/4 hp and smaller.

Features: Capacitor-start and split-phase motors have shallower endplates to materially reduce their length, with ample ventilating openings located below centerline for effective dripproof construction. They have no ventilating openings in the frame, which is of heavy rolled steel.

Description: Sleeve-bearing motors in design are lubricated by means of felt packing, cut to specified shapes and inserted in specially designed bearing housings with inner and outer seals. This construction prevents oil leakage and assures a constant supply of oil to bearings at all times.



Split-phase 1/4-hp motor with resilient base

Quick-break switch and thermal overload protector are securely attached to terminal board which is mounted inside stator frame, eliminating all internal connections to endplates. Terminal board cover can be removed by merely loosening two screws.

These compact motors are available with either sleeve or ball bearings and rigid or resilient bases. Rigid-base motors are welded directly to frame for strength.

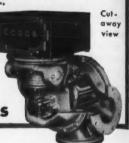
(Capacitor-start and split-phase fractional-hp motors are products of Wagner Electric Corporation, Dept. CP, 6400 Plymouth Ave., St. Louis 14, Mo. Check CP 8750 opposite last page.)

#### **Account For Corrosive Liquids**

ALCOHOLS, VEGETABLE OILS, DEIONIZED WATER, ETC.,

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Rockwell **Stainless** Steel Meters



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#### Be Sure of Your End Product

Want the finest degree of quality control in your formulations? Need accurate cost controls over liquid ingredients? Is inventory a problem? Are losses eating into your profits? Then turn to a basic accounting tool-Rockwell liquid meters. Get the accurate metered records you need to operate efficiently. Available in a wide variety of types, materials and sizes to suit every requirement. Our bulletins tell all. Write today.

YOU CAN RELY



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#### ROCKWELL MANUFACTURING COMPANY DEPT. 106-H, PITTSBURGH 8, PA.

When inquiring check CP 8751 opposite last page



#### Protect against wind driven rain, deterioration

The tough durability of rubber-base paint is now available for OUTSIDE use on industrial buildings. Masonry surfaces protected with this tight coat of rubber-base Cementkote resist moisture penetration. It does not streak, "burn", crack or flake. New or patched surfaces need no curing delay or priming. Rain simply washes it free of dust, dirt, smoke, soot!

EXTERIOR masonry. Write us today!

GOT A SWIMMING POOL? no primer. Write for Pool Paint Bulletin

## Heavy-duty Paints Since 1883

PAINT COMPANY 1128 -1218 W. 70th St., Cleveland 2, Ohie

Subsidiary Parker Rust Proof Co.

When inquiring check CP 8752 opposite last page

#### Aluminum-tin bearing alloys and tinning discussed

Two booklets - one on tinning by immersion processes, other on improved aluminum-tin bearing alloys - give results of certain research projects conducted by the Tin Research Institute. "Some Aspects of Tinning by Immersion Proc-

esses" and "Improved Aluminum-Tin Bearing Alloys" are available from Tin Research Institute, Inc., Dept. CP, 492 West Sixth Ave., Columbus 1, Ohio. When inquiring specify CP 8753 on handy form opposite last page.

#### for use as a bearing liner - porous silver

Porous silver for use as a bearing liner is manufactured with sintered wire and can be made to carry bearing loads as high as 50 to 75% of those of solid silver. Void content can be in the range of 10 to 50%, as desired. Impregnation with various lubricants can be readily accomplished.

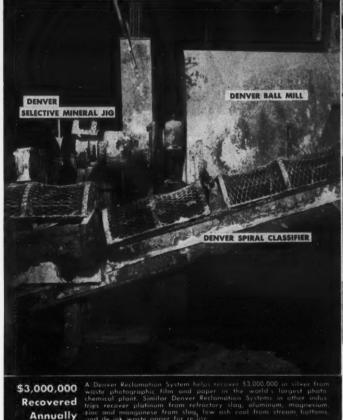
It is available in the form of flat sheet, to be formed by customer into half or full bearing liners. If preferred, it can be supplied as completed bearings, fitted into a steel housing.



Liner can be made to carry bearing loads as high as 50 to 75% of those of solid silver

Material is expected to make possible many selflubricating applications where severe service conditions of temperature, load, or corrosive environment

(Porous silver for bearing liners is a product of The Micro Metallic Corporation, A Pall Filtration Company, Dept. CP, 30 Sea Cliff Ave., Glen Cove, N.Y. . . . or for more information check CP 8754 on the convenient Reader Service slip which is located opposite last page.)





\$64,000 Net Profit in 4 Months

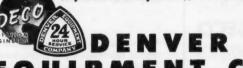
## **DECO** testing lab shows how can be recovered from industria

If you have a valuable product in your industrial waste, find out how Deco can help you recover it at a profit. These case histories are a few examples of how company engineers have worked with the Denver Equipment Company to perfect reclamation systems. These systems have made profits for their owners.

Your engineers are welcomed in our laboratories. We have complete batch test and pilot plant facilities.

There is no obligation to you for a preliminary analysis and recommendation. Write today for details on how to send your samples.

The firm that makes its friends happier. healthier and wealthier



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We are interested in tests on:

\$43,000

Saved Each 

Company.

When inquiring check CP 8755 opposite last page

N G



## Maintenance Service that knows no holidays

Anywhere ... any hour of any day, any night, Sundays or holidays ... you can summon a CONSECO crew of experts for fast retubing, repair or maintenance of any tubular equipment, as well as metal spraying. They'll come fast ... fully equipped with special tools and all the supplies you may need, drawn from our vast stocks of tubes, tube sheets, and specialties.

CONSECO SERVICE is as near as your telephone. Simply call Maintenance Department.

## CONDENSER SERVICE & ENGINEERING CO., INC. Designars and Builders of Equipment for Power, Refining, Chemical and Marine Industries 161 Observer Highway

#### **Equipment Designed and Built by CONSECO**

Conseco and its subsidiaries design, build, and install power and processing equipment and accessories, some of which are listed here. Purchasers of Conseco equipment benefit from our maintenance division's quarter century experience in rebuilding, modernizing, and maintaining our own as well as competitors' equipment. This coordination assures easy accessibility for maintenance and low operating cost. Send for bulletins covering equipment in which you are interested.

HEAT EXCHANGERS
CONDENSERS
EVAPORATORS
STEAM JET AIR EJECTORS
STEAM GENERATORS
PRESSURE VESSELS
CENTRIFUGES
FILTERS and STRAINERS
PUMPS, INSTRUMENTS,
SPECIALTIES

HOBOKEN, N. J.

ENGINEERING

### Standards on lubricants, petroleum, rubber

In book form, compilation of specifications, indexes, and definitions covering petroleum products and lubricants, and rubber products provides compact, readily-usable reference to ASTM standards in these fields.

"ASTM Standards on Petroleum Products and Lubricants" (\$6.65) and "ASTM Standards on Rubber Products" (\$5.50) may be obtained by remitting required amount direct to American Society for Testing Materials, Dept. CP, 1916 Race St., Philadelphia 3, Pa.

## Compact hand pump is easy to operate where needed . . .

self-priming unit has 25' lift

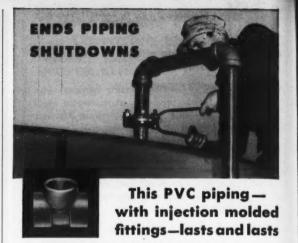
Uses: Handling of a wide range of liquids including petroleum products, water and alcohol, without corrosion.

Features: Pump is easy to operate. It is lightweight, compact for easy installation or transferring from one installation to another.

Description: Rated at 25 gph and delivering one full quart for each complete stroke, pump is self-priming and under normal conditions its vacuum ability is approximately 25' suction lift. Unit incorporates a die-cast aluminum-alloy pump body, composition piston rings, and stainless steel shaft and valves.

A flow register for measuring volume of liquid delivered is provided as optional equipment. Also optional is a safety device which provides for "draining-back" fluid from pump and discharge fittings after each pumping operation, thus preventing possible dangerous spillage of liquid.

(Flow-Master hand pump is a product of Blackmer Pump Company, Dept. CP, 1809 Century Ave., Grand Rapids, Mich. Check CP 8757 opposite last page.)



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At this plant, unplasticized PVC piping handles sulfuric, nitric, muriatic, phosphoric, and acetic.acids. Pressures range to 100 psi. This PVC piping, using Tube Turns Plastics' injection molded PVC fittings, has been in service for months, shows no signs of deterioration. Yet the metal and alloy metal piping it replaced failed at 3 to 12 months intervals from corrosive action. Cut your maintenance—eliminate shutdowns and hazards. Write for free booklet describing properties of unplasticized PVC fittings and flanges. Tube Turns Plastics, Inc., Dept. PA-8, 224 East Broadway, Louisville 1, Kentucky.



When inquiring check CP 8758 opposite last page







Auto-Lite offers many thermometer styles, permitting plant-wide temperature observation at low cost. Standard temperature ranges from minus 60°P to plus 750°F. Send

for latest cotalog showing various types.

THE ELECTRIC AUTO-LITE COMPANY INSTRUMENT AND GAUGE DIVISION TOLEDO 1, OHIO NEW YORK - CHICAGO - SARNIA, ONTARIO

**TEMPERATURE INDICATORS & RECORDERS** 

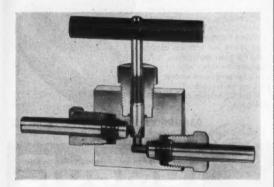
When inquiring check CP 8759 opposite last page

When inquiring check CP 8756 opposite last page

### Pipe threading is eliminated with valves for tubing . . .

ed sts adapter nut and sleeve form gas-tight seal

Low-cost valves for use on tubing can be cut into lines faster and more easily than screw-end valves. Pipe-threading is completely eliminated. Tubing is merely cut to desired length with a hacksaw and burrs are filed off. An adapter nut and sleeve are then slipped onto tubing and connected to valve. This union forms a gas-tight seal.



Valve can be cut into lines faster and more easily

Valve body is made of Type 304 stainless steel and valve stem of heat-treated Type 410 stainless steel with a rolled thread. Valves will hold pressures up to 4000 psi. They are available for four sizes of tubing:  $\frac{1}{8}$ " OD x  $\frac{1}{16}$ " ID;  $\frac{1}{4}$ " OD x  $\frac{1}{8}$ " ID;  $\frac{3}{8}$ " OD x  $\frac{1}{4}$ " ID; and  $\frac{1}{2}$ " OD x  $\frac{3}{8}$ " ID.

(TubeLine valves for tubing are products of Autoclave Engineers, Inc., Dept. CP, 856 E. 19th St., Erie, Pa. . . . or for more information check CP 8760 on handy form opposite last page.)

## Aids in analyzing effectiveness of compressed-air aftercoolers

Prepared as an aid to lowering hidden costs of compressed-air use, 12-page bulletin discusses aftercoolers and separators for compressed-air systems. Suggestions are made for a cost accounting, and check list helps analyze how effective a job is being done by the aftercooler in use.

Moisture of air under pressure at various temperatures is presented in chart form. Cutaway illustrations present company's aftercoolers, cyclone separators, and air filters.

Bul 711 is available from R. P. Adams Company, Inc., Dept. CP, 225 E. Park Drive, Buffalo 17, N.Y. When inquiring reader may simply specify CP 8761 on the convenient Reader Service slip which is located opposite last page.



## identifies metal in Spirotallic®Gaskets

Most engineers know that Spirotallic Gaskets maintain a perfect seal despite extreme fluctuation in fluid pressure and flange compression. Consequently, these gaskets are used in a wide range of service conditions which include high temperatures, elevated pressures and active corrosives. To withstand these conditions, Spirotallic Gaskets employ a variety of corrosion-resistant alloys.

Because so many of these metals look alike, only expensive tests or costly experience with the gasket could determine the gasket metal used, once its identifying tag was lost. Now the color patch on the centering guide tells the metal employed and saves time, trouble and expense. This new method of identification also makes it easier for storekeepers and mechanics who handle the gasket. In addition, it simplifies inventories.

Spirotallic Gaskets hold their seal because they are made of spirally wound interlocking plies of asbestos and springlike metal strip. These gaskets compress easily with light bolting. For catalog PK-35A and copy of color code card

write Johns-Manville, Box 60, New York 16, N. Y. In Canada, Port Credit, Ont.



Here are seven of the metals available and their color identifications

Zinc-coates

Type 304 Stainless

Type 316 Stainlessgreen

> Type 347 Stainless blue

> > tonel range

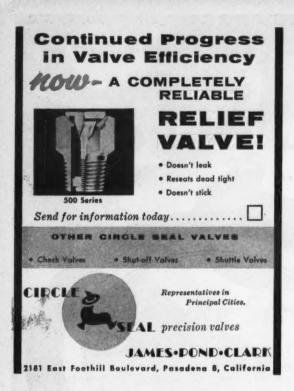
Aluminum





### Johns-Manville SPIROTALLIC GASKETS

When inquiring check CP 8762 opposite last page



When inquiring check CP 8763 opposite last page



Protects metal or concrete against attack by acids, alkalies, waters, oils or greases. Tough vinyl plastic

sticks like a leech. Outlasts ordinary paints many times over. Brush or spray application. Air dries quickly. Wide range of colors.

Mail coupon for free test sample and new booklet on bow to lick corrosion.

483
200 Y

When inquiring check CP 8764 opposite last page

#### **ENGINEERING & MAINTENANCE**

#### Shows how tube is processed to meet requirements

Stainless steel tubing for heat exchangers and condensers is detailed in 12-page brochure. Two typical specifications, ASTM A-249 and A-269, covering this grade of tubing, have been broken down paragraph by paragraph to show how the tube is processed to meet each requirement in the specifications. Photographs illustrate production operations.

Brochure HES-1 is available from Steel and Tubes Division, Republic Steel Corporation, Dept. CP, 224 East 131st St., Cleveland 8, Ohio. When inquiring specify CP 8765 on handy form opposite last page.

#### Improves quality of distillate eliminates periodic cleaning due to scale . . .

condensate return feed unit can be adapted to any make or model steam still

Prime source of complaints in operation of water stills is the continuous buildup of scale which reduces the efficiency of the still and indirectly contributes to a deficiency in the quality of the distillate. In some hard-water locations stills must be cleaned and checked weekly.

To eliminate this, many plants are using a condensate return-feed unit called the Pur-A-Cel. This unit can be installed on any steam heated water still.

Basic design of unit involves redistillation and filtration process using steam supplied by plant as source of raw water. When required, removable filter is installed. Most installations to date have been on hospital stills where distillate is used in intravenous feeding and pharmaceutical mixing. Within the last two years, however, industrial applications have increased.

Largest industrial installation to date has been made on 150-gallon still at Procter and Gamble's Miami Valley Laboratories. Prior to installation of the return feed unit, still labored under heavy calcium deposits that impaired efficiency considerably. Plant was located where temporary hard-water reacted severely on still. It is now overcoming this problem with return feed unit.

Greatest number of installations have been made on old stills, many of them only several months away from the scrap pile. These stills are now producing water of a quantity and quality equal to that produced when the stills were new.

One installation which is obtaining unusually fine grade water is at a large Midwestern university. There, a return feed unit with a special resin bed adapter is used to obtain distillate testing 7,000,000



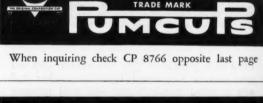
noted for unequalled efficiency and life in all kinds of cylinders -are now greatly exceeding their own performance records! The new 100% Nylon Composition, available only in Darcova Pumcups, does it! Nylon Pumcups are made in

sizes, types and textures exactly right for your particular equipment-ready now to give you unprecedented piston packing performance! Write for helpful data Bulletin

No. 5503.



DARLING VALVE & MANUFACTURING CO. Williamsport 4, Pa. TRADE MARK





Company STEAM TURBINES . MOTORS . GENERATORS . DEAERATING HEATERS .

EJECTORS • CONDENSERS • CENTRIFUGAL COMPRESSORS • TURBOCHARGERS • TUBE CLEANERS • STRAINERS

When inquiring check CP 8767 opposite last page

¥4.9

Fe

ohms per cc specific resistance. This is being done with equipment many years old.

Installation of the unit in most cases can be made at location. Maintenance consists of flushing unit each day for a few minutes by turning a valve. Filter is replaced every two to six months. This involves only loosening of four wing nuts on a mounting plate.

(Pur-A-Cel unit is a product of the Consolidated Machine Corporation, Dept. CP, 39 Sudbury St., Boston 14, Mass. . . . or for more information check CP 8768 on handy form opposite last page.)

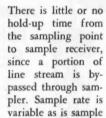
## Takes more representative samples from liquid pipelines . . .

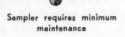
pressures to 350 psi, temps to 200°F, any viscosity handled by sampler

Uses: Extracting line samples of crude oil, fuel oil, gasoline, and most other liquids.

Features: Because sampler extracts many minute samples (300/min if desired), the composite ac-

cumulated is much more representative of constitutent flow than are larger samples taken at longer intervals.





size. Unit has no packing glands, hence no leakage. Minimum maintenance is required.

Description: Sampler can be supplied with control proportional either to time or to flow. Pressures to 350 psi and temperatures to 200°F can be handled by standard models. Special models are available for higher pressures and 350°F.

Unit has no motor or mechanical switches. It is a small, low-capacity piston pump, magnetically-operated and controlled by a simple electronic circuit. Pump can be set to operate from 20 to 300 cycles per minute, with a delivery range of 1/3 to 4½ gal in 24 hr. Stainless steel and other petroleum and chemical-resistant materials are used throughout.

(Automatic pipe line sampler is a product of Gilbert & Barker Mfg. Company, Dept. CP, Cold Spring Ave., West Springfield, Mass. . . . or for more information reader may simply check CP 8769 on the convenient Reader Service slip which is located opposite last page.)

## For PRECISION CONTROLLED

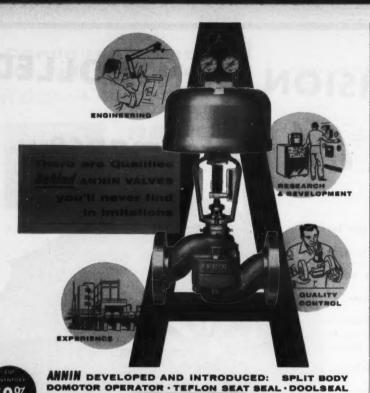
FAN Performance...

operation is essential. In this large vane-controlled unit, high sensitivity is the key to both ease and dependability in manual or automatic control. It serves as a typical example of the wide scope of BAYLEY fan engineering and construction skill . . . Facilities that can be effectively applied to your air handling problems.

No. 807 Aeroplex Kiln Fan With Inlet Vane Control — 125,000 CFM — 7" S.P.



When inquiring check CP 8770 opposite last page



THE ANNIN COMPANY Control VALVES

When inquiring check CP 8771 opposite last page

### What dry materials have you to purify?

You undoubtedly work with dry materials which require separating into various components. If so, you can probably get some interesting and useful information from us on

We make three types of separat-

Specific Gravity Separators. Through a combination of mechanical and pneumatic forces, these machines classify materials according to apparent density.

Mechanical Graders. By means of screens, these machines separate



materials according to sizes of pieces or particles. Exhaust systems are often incorporated to remove fines, dust, etc.

Magnetic Separators. These are principally used for the removal of tramp iron. We furnish them in chute, grate, lifting, and pulley

If you have a knotty separating problem, we may have the answer. Just give us an idea of the job you



THE BAUER BROS. CO. 1728 Sheridan Ave. . Springfield, Ohio

When inquiring check CP 8772 opposite last page

#### ENGINEERING

#### Spray gun operates on pressure as low as five psi

Stripe painting, touch up work, stencil ink spray in shipping rooms, applying silicone mold release oils, and application of metal surface corrosion inhibitors.

Features: Spray gun is designed to operate on air pressure as low



Description: Low-pressure spray gun is an air-operated siphon unit. It is lightweight and draws from a one-quart cup.

(Model P-300 spray gun is a product of John B. Moore Corp., Dept. CP, P. O. Box 3, Peerless Bldg., Nutley 10, N. J. . . . or for more information check CP 8773 on handy form opposite last page.)



"Of course, as a new man you won't expect one of the plusher sales territories.

#### Reduce... MAINTENANCE COSTS WITH FRANGIBLE DISCS

 NO FRAGMENTATION . . . Disc ruptures in several similar lobes. Gives unrestricted

opening. HIGH SPEED PROTEC-TION . . . Sure-fire opening makes FDI discs desirable on all systems, hydraulic or

gaseous. VERSATILITY . . . Use them anywhere in your piping system.

WIDE PROTECTION RANGE . . . Designed to rupture from 5 psi to 5,000 psi . . higher on special The Engineered "Safety Factor"

Pressure system protection is no problem with frangible discs. You decide your own replacement schedule . slide the retainer ring out, replace the disc and re-install. As simple as that.

Send For Our Free Catalog Today



Frangible Discs. Inc. Penns Grove, N. J.

When inquiring check CP 8774 opposite last page

#### A NEW ANGLE IN **TEMPERATURE** REGULATORS

Same quality and superior work-manship of standard Keckley Temperature Regulators, but a new angle type to reduce installation and

fittings cost-for mounting directly on heat exchangers, instant water heaters, etc., with top inlet connections.

The Type T, Angle Temperature Regulator has an overrun feature to protect thermal unit in case temperature at bulb exceeds range of regulator. All wearing parts of stainless steel are renewable. Body is of bronze or semi-steel Available in ½" to 2" sizes

with screwed connections, 2" to 8" with flanged connections. Sizes 1/2" to 4" are spring loaded, sizes 5" to 8" are weight loaded.

Send for Data and Catalog 55-B =



400 W. Madison St. • Chicago 6, III.

Pressure Regulators . Temperature Regulators . Float Valves

When inquiring check CP 8775 opposite last page

CHEMICAL PROCESSING

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Protects and preserves roofs while reducing under-roof temps up to 20°F . . .

> aluminum-asbestos coating also has resistance to chemical vapors, gases, fumes

To protect and preserve roofs while reducing under-roof temperatures as much as 20°F.

Aluminum flakes in coating reflect sun's rays and turn back approximately 71% of sun's heat. Coating will also shield buildings against cold. By holding roof temperatures more nearly constant with those of building interiors, condensation is reduced by 60 to 70%. Consequently, coating is well suited for use on concrete block walls.

Aluminum coating also withstands chemical vapors, gases, and fumes. It is not affected by roof expansion and contraction and does not crack or blister.

Coating is basically composed of asphalt, long strand Canadian asbestos and waterproofing oils. To these have been added silicones and metallic aluminum flakes. Coating comes mixed and ready to use in 5-gal cans and 30 to 55-gal drums. It does not require heating or thinning and can be sprayed on or applied with a roofing brush or squeegee.

(Asbestolite roof coating is a product of The Monroe Co., Inc., Dept. CP, 10703 Quebec Ave., Cleveland 6, Ohio . . . or for more information check CP 8776 on handy form opposite last page.)

#### Adapt low-pressure rotary joint to withstand temperatures up to 550°F . . .

piston and piston seal have been redesigned

For rotary joint applications where temperatures range up to 550°F.

Features: Piston and piston seal have been designed for more efficient sealing, with increased sealing contact surfaces. A formed shape of Rulon (Dixon Corporation's low-friction bearing material) is fitted to piston and maintained under pressure by sealing spring and line pressure. This is in effect a stationary (not a moving) seal.

Description: In operation, balanced piston makes use of line pressure to control unnecessarily high pressure against rotating sealing surfaces. This reduces friction, high torque, and wear to a minimum. Equipped with a self-adjusting wear take-up, joint is leakproof, hot or cold.

(Low-pressure rotary joint for high temperatures is a product of Anco Division, American Associates Inc., Dept. CP, 1 Baker Street, Providence 5, R.I. . . . or check CP 8777 opposite last page.)



## This Moyno Pumps Potato Salad With Slices Up To 11/4-inch...Without Crushing!

The Moyno can pump potato salad and a lot of other materials without making mush out of them-because of the unique progressing cavity principle.

Moynos have no valves and pistons, no vanes or other devices that cause churning and turbulence. The Moyno has a simple screw-like rotor turning within a double-threaded stator. This design creates cavities which progress smoothly toward the discharge end of the pump, carrying the material being handled. The material is not squeezed or churned.

#### **Pumps Practically Anything**

That's why the Moyno successfully handles such hard-to-pump materials as non-pourable pastes, frits, plaster, highly volatile liquids, and materials containing large particles, such as potato salad, fruit, cherries, chow mein-even oysters! In fact, the Moyno handles practically anything that will pass through a pipe.

#### Many Other Advantages

Moynos pump many hard-to-pump materials with a minimum of abrasion and wear. Many plants have adopted Moynos simply because they last so long.

Moynos provide positive displacement. Moynos can pull up to 29 inches vacuum while discharging under pressure. Big Moynos deliver up to 500 gpm; can provide pressures up to 600 psi in the smaller frame sizes. They even get up to 1000 psi

The Moyno is reversible—it pumps equally efficiently in either direction.

With the Moyno, accurately metered flows are obtainable by regulating operating speed.

Moynos are trouble-free. They are self priming; won't cavitate or vaporlock. There's just one moving partno valves to stick, no pistons to gum up. Built for tough service. Easy to maintain. Moyno pumps are easy to take apart for cleaning.

#### Write For Bulletin

You may save a good deal of money or solve a tough problem by finding out about this simple, versatile pump. Write for Bulletin 30CP.





Rotor is like a stretched-out corkscrew. It turns within a stator that has a double internal thread. Thus rotor and stator form closely fitted cavities. As the rotor turns, these cavities progress evenly toward the discharge end of the pump without closing up. That's why the Moyno easily handles materials without crushing. churning, or aerating; and why it can handle so many different things-solids in suspension, pastes, abrasives, highly volatile liquids, tars, soaps, caustics-even cement and plaster.



#### FOR DESIGN ENGINEERS

Moynos are available in small sizes and special designs for use in automatic washers, drink dispensers, sprayers, oil burners, machine tools, gasoline pumps, and a wide variety of other equipment. If you are designing ma-chinery, we'll work with you, in confidence, to integrate pump design with your problem.

## BBING & MYERS, INC.







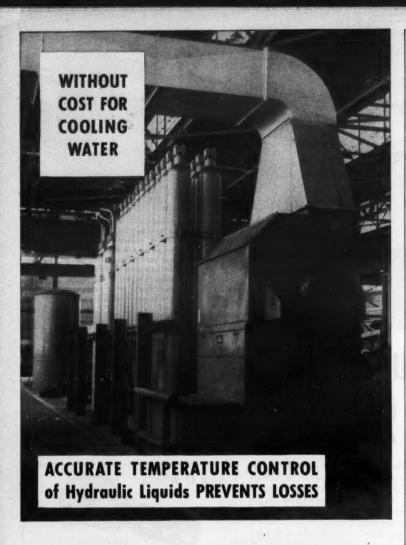












● This NIAGARA AERO HEAT EXCHANGER cools the liquid for a large hydraulic press, preventing heat damage to the pump stuffing boxes. Using outdoor air as the evaporative cooling medium, it removes the heat at the rate of input (1,875,000 BTU/hr.) with no cooling water consumption except a negligible amount evaporated.

Air is free and cheaper to move than water. You can save much expense in pumping, piping and power, and quickly recover the equipment cost from the water saving.

Similar Niagara machines cool water, oils, solutions, lubricants and coolants for many mechanical, electrical and chemical processes. You can cool quench baths, welding machines, plastic molds, furnaces, controlled atmospheres, gases, compressed air either for power or instruments or processes. In a closed system, your coolant is never contaminated. The system is simple and easy to keep up; the equipment has a long, useful life. Select from a wide range of sizes up to 30,000,000 BTU.

Write for Bulletin 120 to obtain a complete description.

#### NIAGARA BLOWER COMPANY

Dept. CP, 405 Lexington Ave.

New York 17, N. Y.

Niagara District Engineers in Principal Cities of United States and Canada

When inquiring check CP 8779 opposite last page

#### ENGINEERING

### Ends leaks in walls of metal buildings

Leakage through metal walls of buildings is being prevented by caulking compound developed to solve more severe problems in pressurized cabins of airplanes. Sealing compound withstands temperatures from -65 to 250°F, excessive vibration, strong sunlight, weathering, and aging. Base used in compound is Thiokol synthetic rubber.

Caulking compound can be applied without shrinkage and sets to a resilient rubber with good adhesion to metal and glass.

(DEL synthetic rubber caulking compound is a product of David E. Long Corp., Dept. CP, 220 E. 42nd St., New York 17, N. Y. . . . or for more information check CP 8780 opposite last page.)

## Automatic torque control gives smooth transfer of power . . .

overload danger eliminated by self-contained fluid clutch

Current and motor size requirements, to bring high-inertia loads up to normal running speed with complete safety, are minimizd with hydraulic clutch. Unit controls torque automatically to assure smooth transfer of power from motor to driven part while keeping torque values within safe limits at all times. Danger that overload will burn out or seriously damage motor is eliminated.

Self-contained automatic fluid clutch is available in sizes from 5 to 100 hp with a wide range of stall torque values to protect both clutch and motor in event of jamming. Unit can be supplied for either direct drive or with sheaves for belt drive.

(Automatic fluid clutch is a product of Department 13, Tri-Kris Company, Dept. CP, Walnut above Hatfield Sts., P. O. Box 631, Lansdale, Pa. . . . or check CP 8781 opposite last page.)

## TRENT "FOLDED-AND-FORMED" HEATING UNITS THE ANSWER TO ROLLER HEATING PROBLEMS



When you're faced with the problem of drying paper, heating wax, glue or asphalt on rollers, you'll find your solution through the faster, higher, more uniform radiant heat furnished only by Trent "Folded-and-Formed" Roller Heating Units.

#### HERE'S WHY-

Trent "Folded-and-Formed" exposed ribbon type resistor heating elements radiate controlled, electrical heat from a special rack inside the roller. This compact, uniquely designed element assembly remains stationary while the roller revolves about it insuring rapid, uniform temperature along the surface of a roll of any length. Roller diameters can vary from 6" to 60".

Drying • Curing • Embossing • Evaporating
are accomplished faster, more effectively, and with
greater economy through the performance
of Trent "Folded-and-Formed" healing
elements. They are constructed to assure
maximum rigidity for long life and
easy maintenance even under hardest
use. They pay off in -

GREATER PRODUCTION
 HIGHER QUALITY
 LOWER COST

Fee

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Trent Engineering Service
An experienced Trent engineer
will gladly survey your requirements to holp you determine
the most efficient, economical
approach to your heating problems. In the meantime, write
for the new Trent "Folded-andFormed" Heating Element Booklet.



When inquiring check CP 8782 opposite last page

Your kind of . . .

## **Solenoid Valves**

There IS something better in solenoid valves the new Marsh Electrimatic. Bodies machined from solid brass stock mean extra strength, greater dependability. Coils are moisture and frost proof. Valves are tight seating, smooth, positive, quiet. Types for

wide range of application: direct acting —or pilot operated for large capacity.

conditions and we will tell you how we can help you with your Solenoid problems.

MARSH INSTRUMENT CO. Sales affiliate of Jas. P. Marsh Corp.

Dept. Z., Skokie, III. • Marsh Instr. & Valve Co. (Can.) Ltd. 8407 103rd Street, Edmonton, Alberta, Canada

When inquiring check CP 8783 opposite last page

CHEMICAL PROCESSING

A few strokes of pump lubricate bearings while machine is idle or in operation . . .

NITS EMS

type

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ce of 60".

system is automatically vented and recharged when pump handle is released

Uses: Centralized lubrication of production machinery.

Features: Positive, high-pressure centralized system provides controlled lubrication of bearings while machine is operating or while idle.

Description: Pumping unit is manually-operated and incorporates a 15-lb capacity reservoir for grease or oil. A few strokes of pump handle forces lubricant under 2500 psi through a single line circuit of injectors, or adjustable hydraulic force-feed measuring valves, one for each bearing. These injectors, or valves, in turn deliver a measured quantity of oil or grease to each bearing every time system is cycled.



Pump forces lubricant under 2500 psi to measuring valve for each bearing

After a few strokes of the pump handle, an indicator device shows when lubrication cycle is complete. Release of pump handle by operator automatically vents and recharges system.

Pump has button head filler fitting for refilling reservoir from a bucket pump, or may be hand-packed. System comes complete with all necessary accessories.

(Centro-Luber system is a product of Industrial Division.

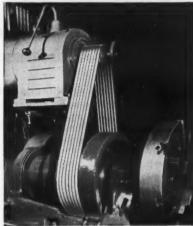
Lincoln Engineering Company, Dept. CP, 5780 Natural Bridge Avenue, St. Louis 20, Missouri . . . or for more information check CP 8784 on handy form opposite last page.)

#### **Tube and fittings illustrated**

Company's tube, fittings, and custom fabrications are described in 24-page brochure. Materials of construction and various other engineering data are included.

Brochure 502 is issued by Felker Bros. Mfg. Co., Dept. CP, Marshfield, Wisconsin. When inquiring specify CP 8785 on handy form which is located opposite last page.

This large lathe was formerly driven by a flat belt which slipped on heavy cuts, stalled and broke tool bits. Savings on broken tool bits alone offset the cost of the drive the first year—and production was increased 25% after the V-belt drive was increased.





lengthen V-belt life ... cut costs



Hundreds of plants that keep track of V-belt drive costs know this: Gates Vulco Ropes . . . the

V-belts with concave sides...wear much longer and cost less per year of service.

Here is the interesting reason why:



When a Gates V-belt bends around the sheave, the *precisely-engineered* concave sides (Fig. 1) fill out and become straight. Thus

the sides of the belt make full, uniform contact with the pulley (Fig 1-A).

Naturally, uniform contact distributes the wear evenly. And even wear means longer wear.

Longer wear saves not only on replacement

costs; it also saves the cost of down-time.. keeps equipment producing.



Simple test proves value of concave sides



Take a straight-sided V-belt (Fig. 2) and bend it. Feel the sidewalls of the belt bulge out as the belt bends. You see im-

contact with the bulging sides prevent uniform contact with the pulley (Fig. 2-A). Uneven contact causes faster wear...increases your drive replacement costs.

Let the cost-saving longer life of Gates Vulco Ropes contribute to *your* profits. Specify Gates Vulco Ropes—the V-belts with concave sides (U.S. Patent 1813698). The Gates Rubber Co., Denver, Colorado—World's Largest Maker of V-belts.

Gates Engineering Offices and Distributor Stocks are located in all industrial centers of the United States and Canada, and in 70 other countries throughout the world,

TPA-54

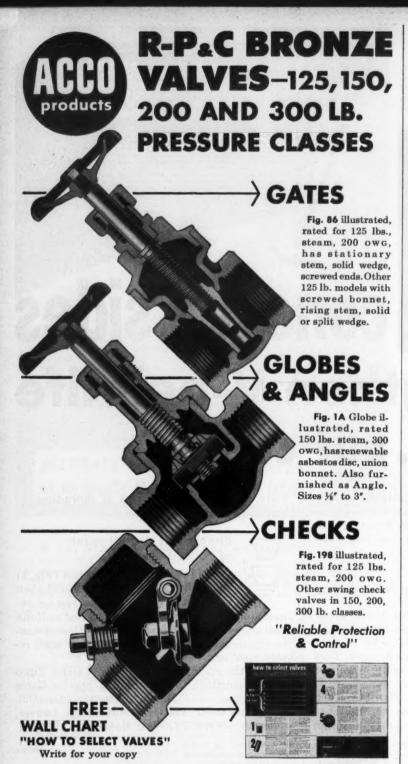
GATES



DRIVES

When inquiring check CP 8786 opposite last page

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R-P&C Valve Division AMERICAN CHAIN & CABLE

Reading, Pa., Atlanta, Boston, Chicago, Denver, Detroit, Houston, New York, Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

Better **Values** 

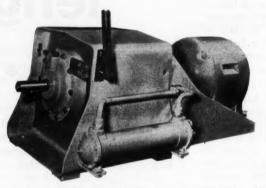
When inquiring check CP 8787 opposite last page

#### Fluid drive transmission lets motor come to speed under no-load conditions

This allows simplification of motors and starting equipment for starting under heavy loads

Smooth transmission of power in power plants, refineries, other general industrial applications.

Features: Fluid drive permits motor to come up to speed under practically no-load conditions. This allows simplification of motors and starting equipment for heavy starting loads. Across-the-line starting is practical in many cases.



Drive is readily adaptable for manual of fully-automatic control

Units will limit amount of overload torque which can be transmitted to load. Torque transmitting capacity is adjusted by positioning speed control lever. Rate of movement of same lever governs acceleration rate. Drive is readily adaptable to manual or fully-automatic control.

Description: Fluid drive units are self-contained and ready for immediate installation. They are available in six sizes, 71/2 to 800 hp, for operating speeds up to 1800 rpm. Heavy, welded steel housing serves as an oil reservoir as well as an enclosure for rotors. gearings, oil circulating pump, and speed regulating scoop tubes.

(Type VS Class 2 Gyrol fluid drive is available from American Blower Corporation, Dept. CP, 8111 Tireman Ave., Detroit 32, Michigan . . . or for more information on manufacturer's product reader and simply check CP 8788 on handy form or osite last page.)

#### No fitting is too good for me because I have to stand beside them!

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THAT'S WHY I

"Just one pinhole leak or one fitting 'letting go' could mean disaster for me, equipment and property. That's why I use the best-Swagelok Tube Fittings. They are built for rugged service and unusual operating conditions."

Swagelok Tube Fittings because of their unique design provide strong, torquefree, leakproof seals in all tubing connections. Two ferrules and the threaded thuck grasp the tube tightly. No special tools are needed for assembly or disassembly and no preparatory work on the tubing is required.

For complete information write for the Swagelok catalog. Address Dept. C2



Swagelok Tube Fittings Available in: Brass, Aluminum, Steel, Stainless Steel, Monel, Zytel\* \*DuPont trade-mark

#### CRAWFORD FITTING CO.

884 E. 140th Street

Cleveland 10, Ohio

When inquiring check CP 8789 opposite last page

CHEMICAL PROCESSING

# Many header problems solved with multiple-branch tee

Multiple-branch tee with integral extruded outlets makes possible economical solution to many header problems in the petroleum, chemical, and power fields. It can also be used advantageously in the fabrication of piping for air conditioning and radiant heating systems.



Tees are "tailored" to individual jobs

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Tee conforms to Code for Pressure Piping area replacement formula. It is especially useful where branch outlets are appreciably smaller than the run pipe. Size, wall thickness, and number and size of outlets are determined by individual service conditions. Tee is available in all commercial metals and alloys.

(Multiple-branch tees are products of Tube Turns, a Div. of National Cylinder Gas Company, Dept. CP, 224 East Broadway, Louisville 1, Ky. . . . or for more information check CP 8790 on handy form opposite last page.)

# Removes neoprene compounds quickly, efficiently . . .

a polyglycol ether, solvent has high flash point, low toxicity

Uses: Quick and efficient removal of protective neoprene compounds.

Features: When used in removal of neoprene compound from aircraft Radomes, solvent saved as much as 7½ man-hours over old method of cleaning. Material is merely mixed as a paste and applied to Radome. After two hours, mixture and neoprene compound are easily removed.

Description: This solvent for neoprene, a polyglycol ether, has a high flash point and a low toxicity factor.

(Solvent for neoprene, Ansul Ether 181, is a product of Ansul Chemical Co., Dept. CP, 3300 Hegley St., Marinette, Wis. . . . or for more information check CP 8791 on handy form opposite last page.)

apades in industry

Once upon a time there was a Production Superintendent who radiated Btu's like a boiler gone berserk. He got that way because of balky pumps.

"It's a viscous circle," he snarled at his Assistant. "Every time we try to pump asphalt or hot road oil, these infernal pumps conk out. Lines get tied up. Tanks can't be cleaned. Barges and trucks can't be loaded. Process units shut down..."

"A truly deplorable state of affairs," sympathized the Assistant, "but not uncommon in refineries and petrochemical plants..."

"Do something about it!" roared the Production Super. "Find me some dependable pumps to handle viscous materials, or I'll make you a night watchman!"

"I never liked night work," said the Assistant. "So—here goes." He bolted into his office and dived into his data files.

# THE CASE OF THE PAMPERED PUMPS AND THE SUPERHEATED SUPERINTENDENT







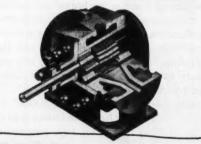
What he wanted was there! A copy of Schutte and Koerting Bulletin 17-A on Gear Pumps. Types, operating ranges, design features — just the information he needed. "Steam jacketed gear pumps," said the Assistant. "Could be. I'll have a talk with an SK Sales Engineer."



He did—and the SK pump expert was more than helpful. He asked some searching questions about materials to be handled, gave the Assistant a careful analysis of his problem—and came up with a specific recommendation.

#### MISSION ACCOMPLISHED - EASILY!

Installed over a whole area of pumping jobs, SK Fig. 1738
Steam Jacketed Herringhone Gear Pumps now handle viscous materials of many types, in a wide range of temperatures. Asphalt and road oils stay hot—and keep meving. The Assistant is now First Assistant. And the Production Super is operating at lower temperatures than he has in months!



#### MORAL:

Send for your copy of Bulletin 17-A on Gear Pumps. And when you're ready for more details, call in a specialist—your nearest SK Sales Engineer.



2215 STATE BOAD, CORNWELLS HEIGHTE SUCKS COUNTY, FA.

Strainers • Condensers and Vacuum Pumps
Oil Burning Equipment • Rotameters
Flow Indicators • Radiafin Tubes • Valves
Spray Nozzles and Atomizers • Gear Pumps
Desuperheaters

Jet Apparatus . Heat Transfer Equipment

When inquiring check CP 8792 opposite last page



Service in working pressures to 300 p.s.i.g. is offered by the new VAREC Figure 2500C Automatic Tank Gauge. It's a high pressure model of the successful VAREC Figure 2500 Series, equipped with the Neg'ator motor, which eliminates use of counterweight and simplifies installation. This series has been tested by 3 years of service in the Petroleum and Chemical fields, after 2 years of experimental and development work.

An important part of this new model is the magnetic drive, which requires no packing gland or mechanical seal on rotating shaft. The use of stainless steel ball bearing construction throughout provides a combination that reduces friction to a minimum.

Liquid level indication on a mechanical counter and dial for convenient, easy reading. Components are enclosed in a separate compartment to keep tank vapors from fogging dial. Operation checker is standard equipment.

All the field-tested, desirable features of the VAREC Figure 2500 Series have been incorporated in this

new gauge for high pressure service — the Figure 2500C.

Varec

#### VAPOR RECOVERY SYSTEMS COMPANY

2820 North Alameda Street Compton 1, California

961-9

Cable address: VAREC COMPTON Calif. (U.S.A.) All Codes

When inquiring check CP 8793 opposite last page

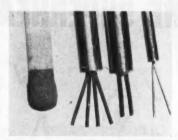
#### ENGINEERING

# Pressures to 40,000 psi withstood by rugged thermocouple wire . . .

durability of outer tubing makes conduit unnecessary

Uses: Thermocouple and extension wire applications calling for extremely small diameters.

Features: Metallic clad wires are magnesium-oxide insulated. Durability of outer metal tube makes conduits unnecessary. Not even a hammer blow will injure it, since it will withstand pressures up to 40,000 psi.



Thermocouple wires, 1/16 and 1/8" diam., compared with paper match

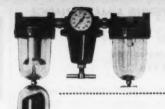
Description: Thermocouple wires are made in lengths up to 30 ft and the extension wires in varying lengths up to 2000 ft, depending upon metal tubing and outside diameter. A variety of materials are available in several gages and outside diameters.

(Ceramo thermocouple and extension wires are products of Thermo Electric Co., Inc., Dept. CP, Saddle River Township, Rochelle Park Post Office, N. J. Check CP 8794 opposite last page.)

# Test report on MoS<sub>2</sub> as a lubricant

Test report details comparison tests between a highly-concentrated MoS<sub>2</sub> paste and other thread lubricants at room and elevated temperatures.

Field Report 141 is available from The Alpha Corporation, Dept. CP, 65 Harvard Avenue, Stamford, Conn. Specify CP 8795 opposite last page.



Write for

twenty-page

illustrated

catalog and

# controls

# FOR CONDITIONING AND CONTROL OF COMPRESSED AIR

Autopneumatic control assembly
... or individual units

filters/lubricators/regulators/water trap

Reduces MAINTENANCE-REPAIR and DOWN TIME to a minimum on all AIR POWER TOOLS and APPLIANCES.

Pipe line sizes:  $\frac{1}{4}$ ",  $\frac{3}{8}$ ",  $\frac{1}{2}$ ",  $\frac{3}{4}$ ", 1" — and larger capacity

arrow tools, incorporated

1904 S. Kostner Ave., Chicago 23, Illinois

When inquiring check CP 8796 opposite last page



STRAHMAN VALVES, INC., NEW YORK 13. U.S. A.

When inquiring check CP 8797 opposite last page

CHEMICAL PROCESSING

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#### It's not too late to check in-plant rail facilities . . .

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here are some things to look for and correct in poor track conditions

Neglect of railroad sidings within a plant's property line can result in inefficient movement of materials, lost time, money and labor, and conditions that may lead to serious equipment damage or injury to personnel. Here are a few of the many poor track conditions that should be checked and corrected.

- 1. Poor drainage around ties, loose bolts, and excessive rail expansion should be corrected immediately.
- 2. Old or worn tie plates should be replaced.
- 3. Check for deterioration of rail ties.
- 4. Poor switch conditions endanger entire track operation. This situation may be due to loose or missing bolts, heavy growth and poor drainage.
- 5. Remove mud and debris collected between rail and switch.
- Check for badly worn frogs two rail "V's" butted together.
- 7. Make sure that rail switches are adjusted properly so they can open and close efficiently.

(Information courtesy of supplier of rail and track accessories, L. B. Foster Company, Dept. CP, P. O. Box 1647, Pittsburgh 30, Pa. . . . or for more information reader may simply check CP 8798 on the convenient Reader Service slip which is located opposite last page.)

#### THAT'S INTERESTING

## Powerful motors create powerful wind

Giant 83,000-hp synchronous motors, built by Westinghouse, will power the USAF transonic and supersonic wind tunnels at Arnold Engineering Development Center, Tullahoma, Okla. Induction motor of 25,000 hp is used to start each synchronous unit and accelerate the rotating mass to its rated 600 rpm.

Motors will be used to drive compressors which are designed to produce air speeds to 3800 mph in the wind tunnels. Supersonic planes, jet engines and guided missiles will be tested and evaluated in the tunnels.

Despite the great weight and speed of the motor and compressor system, it can be stopped in about three minutes by using the wound-rotor motors as brakes. boiler check-up time!

# HOW ARE YOUR BLOW-OFF VALVES?

Are they drop-tight? Rugged and dependable?

Easy to maintain?

Just as important, do they have all the advantages and up-to-date improvements in materials and design of new YARWAY Blow-Off Valves?

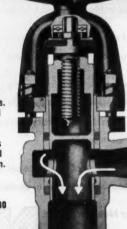
Old YARWAY Blow-Off Valves also can be overhauled and modernized, because all YARWAY improvements are interchangeable with parts on earlier models.

Write today for free YARWAY Blow-Off Valve CHECK SHEET—also new YARWAY Blow-Off Valve Catalog B-426 (pressures to 400 psi) or B-434 for higher pressures.

#### YARNALL-WARING COMPANY

125 Mermaid Avenue, Philadelphia 18, Pa. Branch Offices in Principal Cities





YARWAY

blow-off valves

When inquiring check CP 8799 opposite last page

Yarway Seatless

Tandem Blow-Off

angle-straightway

combination.

Valve-



Newark Wire Cloth is made of all malleable metals such as aluminum, brass, bronze, phosphor bronze, copper, monel, Nichrome, nickel and stainless steel; as well as the noble metals such as gold, silver, platinum, etc.

This wide range of metals enables you to select the one wire cloth to meet your conditions of corrosion and/or contamination.

In all metals, Newark Wire Cloth is accurately woven in a wide range of meshes, ranging from very coarse (4 inch space cloth), to extremely fine (up to 400 mesh). Our reputation for 'Accuracy' through more than 75 years is your guarantee of wire cloth quality.

We maintain a large stock of popular sizes in the more commonly used metals and can make prompt shipment. Let us quote on your requirements.



351 VERONA AVENUE . NEWARK 4, NEW JERSEY

When inquiring check CP 8800 opposite last page

#### **ENGINEERING**

Uniform sealing assured with autoclave door that opens fast . . .

> rack and pinion is employed for opening and engaging

Quick-opening door for autoclaves and vulcanizers.

Features: Unit has a large-diameter boss on which the rigid, lightweight, all-fabricated door rotates to engage lugs for sealing. Ranging from 8 to 24" in diameter, depending on size of door, it provides



Universal rack and pinion is employed for engaging door

many times the bearing area possible with small-diameter pins. This produces a more stable assembly, eliminating wobble and difficult closing due to pin and bearing wear. Uniform sealing is assured.

Description: Universal-t y p e rack and pinion is employed for engaging and rotating door. Permanently attached and always ready for use, it provides positive action with minimum effort, eliminating use of heavy bars for rotating door. Pinion lever is hinged so that it can be swung out of the way when not in use.

Lugs on both door and heavy cast shell are precision-machined to provide accurate fitting around entire diameter. Hinge pin is a largediameter precision ground shaft rotating in heavy, gun-lubricated bronze bushings. A heavy roller thrust bearing supports weight of

(Quick-opening autoclave door is a product of Gussett Boiler & Welding, Inc., Dept. CP, 1545 Whipple Rd., S.W., Canton 10, Ohio . . . or for more information check CP 8801 on handy form opposite last page.)



When inquiring check CP 8802 opposite last page

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Direct Acting Solenoid Valves are proving an ideal answer for service on steam lines. Their design removes the solenoid proper from the heat of the line, permits a leverage system with ample power to open against differential pressures up to 150 lbs. There are no pilot valves or auxiliary pistons, and construction is really heavy duty throughout. You will find their inherent simplicity and instant response will solve a lot of operating problems like no other valve can.



826 Wood St., Three Rivers, Mich.

When inquiring check CP 8803 opposite last page

#### facilities for plate fabrication pictured and described

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Experience and facilities of company in the field of steel and alloy plate-fabrication are presented in 12-page bulletin. Photos illustrate typical examples of plate-fabrication work done. Included are columns, towers, refractionators, condensers, evaporators, fermenters, and other pressure tanks and vessels.

Bul PF is available from Downingtown Iron Works, Inc., Div. of Pressed Steel Tank Company, Dept. CP, Downingtown, Pa. When inquiring reader may simply check CP 8804 on the convenient Reader Service slip which is located opposite last page.

#### Reversed direction of air stream increases condenser capacity, cuts power costs . . .

air enters at top of 200-ton refrigeration capacity unit in operation

Uses: High-capacity industrial and commercial refrigeration installations.

Features: Air stream enters at top of condensing section, is drawn downward through water sprays, over condensing coils, and then turns upward to leave unit through propeller fans at top. This reverse direction air stream, a departure from previous practice, increases capacity of unit and reduces outlay for electric power.

Spray water falls into a tank at base of unit, from which it is recirculated, with a net water consumption of less than 5% of water used by submerged coil condensers of equal capacity.

Description: Basic principle of unit is that of evaporating sprayed water from surface of condensing coils through which refrigerant gas passes, extracting heat at the rate of 1000 Btu per pound of water evaporated. Unit, of 200-ton refrigeration capacity, is equipped with a precooling coil which removes superheat from refrigerant gas making it close to condensing temperature before it enters sprayed, condensing section. This avoids precipitation of scale deposits.

In gas line, between precooler and condensing coil, oil vapor is condensed and is easily removed from refrigerant.

Unit is compact, measuring approximately 8½ x 14 x 16′, weighing approximately 13 tons.

(Ammonia condenser is a product of Niagara Blower Company, Dept. CP, 405 Lexington Ave., New York 17, New York . . . or for more information about manufacturer's product, reader may simply check CP 8805 on the convenient Reader Service slip which is located opposite last page.)

# 9ts-Your Move

#### COMPLETE LINE-TOTALLY-PROTECTED A-C. MOTORS

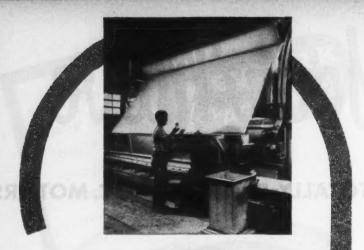


Reliance is pleased to announce the immediate availability of a complete line of Reliance Totally-Protected A-c. Motors in the new NEMA frames 182-326U.

# RELIANCE ELECTRIC AND ENGINEERING CO.

Cleveland 10, Ohio . Offices in Principal Cities

When inquiring check CP 8806 opposite last page.



# NOW 3 GREAT FEINC FILTERS FOR REALLY CONTINUOUS FILTRATION

Easy or tough, your continuous filtration is different. It takes a lot of experience plus careful study of your specific problem to select and design the smoothest running, most economical filter. Filtration Engineers Inc. offers you more than 35 years of this kind of experience . . . backed by proved ability to deliver tailor-made filters at no more than standard costs.

The FEinc String Discharge Filter . . . the original string filter . . . handles all types of cakes . . . even thin soupy slimes. The strings lift the cake from the cloth cleanly, and eliminate common problems of smearing, blinding and blow-back. Cloths last longer, with less down-time for washing or replacements. Often it's the most economical filter for easy jobs as well as tough ones. Special features included submergence washing and compression dewatering.

The new FEinc horizontal filter, simple, troublefree, is recommended for free-filtering materials such as coarse granules, or fibrous cakes. Countercurrent washing is available.

FEinc scraper filters, for standard problems, are quality built, with many special constructions, such as rubber covering, totally enclosed housings, etc. On filter at right, for instance, drum submergence can be varied at will from zero

Ask today for full details or analyses . . obligation, of course.

# Filtration Engineers, Inc.

CUSTOM DESIGNERS AND MANUFACTURERS OF ALL TYPES OF CONTINUOUS FILTRATION EQUIPMENT

155 ORATON STREET . NEWARK 4, N. J.

When inquiring check CP 8807 opposite last page

#### **ENGINEERING & MAINTENANCE**

In tough service for four years, bronze globe valve has needed no maintenance . . .

> flat-seat design and patented seating metal combination does job

Uses: Globe valve installations where service conditions are difficult. Typical installations are made on steam lines, hot water lines, and lines carrying chemicals which attack stainless steel and other seating alloys.

Features: During four-year testing program, valve has never failed or leaked, even in most difficult installations. Performance is made possible by a

patented seating metal called Brinalloy and the flat-seat design of the valve. Excellent wear and corrosion - resistance of this alloy makes practical the flat-seat design for throttling service.

Brinalloy is so resistant to wear and corrosion that it can be fused permanently into valve for its entire service life. Therefore, seats and discs in the valve do not require replacement, renewing, or regrinding.

STRING

**FILTERS** 

HORIZONTAL

**FILTERS** 

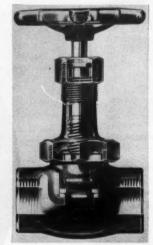
**SCRAPER** 



Bronze globe valve has a simple and streamlined exterior

design. Stem design eliminates valve failure from stem-thread wear. Valve is available in 1/4 to 2" sizes, 150-lb SP, 300-lb WOG.

(LQ600 bronze globe valve is a product of The Lunkenheimer Company, Dept. CP, Box 360, Cincinnati 14, Ohio . . . or for more information check CP 8808 on handy form opposite last page.)



Seats and discs in valves require no replacement, renewing, or regrinding

#### Reviews features, specifications of steam cleaners

Line of compact steam cleaners, featuring capacities from 300 to 3000 gph, is described and illustrated in two-page bulletin.

Bul 136 is available from Kelite Products, Inc., Dept. CP, 1250 North Main Street, Los Angeles 12, California. When inquiring specify CP 8809 on handy form opposite last page.

# now...

more effective and economical

# ENTRAINMENT **SEPARATION**

with the

# MIST ELIMINATOR

Check these important points:

- 1. Half the pressure drop of Standard Mist Eliminator.
- 2. Safe operating limits 10% to 12% higher velocity.
  3. Entrainment removal practically 100%
- over wider operating range.
- 4. Three to four times longer on-stream life under coking conditions or where solids are present.
- 5. Lower cost wires repositioned by Herringbone Fold.
- \*U.S. Patent No. 2,565,846, Aug. 28, 1951



These photos show the difference, Full explanation given in our Booklet ME-5.



Send for Revealing Booklet ME-5. Learn how repositioning wires by pat-ented Herringbone process and change in size and contour of mesh openings make this new Mist Eliminator more effective and economical.

# METAL TEXTILE

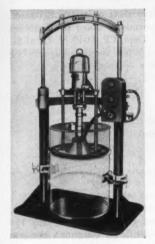
**Metal Textile Corporation** of Canada, Ltd., Hamilton, Ont.

> When inquiring check CP 8810 opposite last page

CHEMICAL PROCESSING

Cleans 55-gal drums as it empties them of semi-solid, thick, or gummy materials . . .

savings in material are reported to pay for the pump and "ram" combination



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28, 1951

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Uses: Pumps thick, gummy, or semi-solid materials direct from 55-gal drums to spray or extrusion guns or to other containers.

Features: It is reported that this airoperated "ram" and pump pays for itself quickly by completely evacuating drums of high-priced materials.

Description: In operation, follow plate is "rammed"

pneumatically into drum. As it descends, its wide, flexible edge scrapes sides of drum clean and forces material into pump.

A large selection of air-operated pumps is available for use with "ram" unit, depending upon job requirements and material.

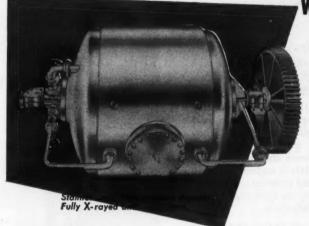
(Air-operated "ram" and pump are products of Gray Company, Inc., Dept. CP, Graco Square, Minneapolis 13, Minnesota . . . or for more information check CP 8811 on handy form opposite last page.)



Centrifugal compressors, which have economic advantages where pressure ratios are low and loads and pressures are constant, are now being offered by company. Line of units, ranging in capacity from 500 to 65,000 cfm, is designed to augment company's reciprocating compressors now serving in the petroleum, gas, and processing industries.

(Centrifugal compressors are products of the Cooper-Bessemer Corp., Dept. CP, Mount Vernon, Ohio. Or for more information check CP 8812 on handy form opposite last page.)





WAS MAKING INDIVIDUALIZED CHEMICAL EQUIPMENT

With official recognition of the American Indians as citizens, this country entered a new era of peace and solidarity. During the same period, our expanding chemical industry was also taking great strides forward—aided and encouraged by such developments as KOVEN Individualized Chemical Equipment. Far-sighted chemical manufacturers quickly learned that dependable KOVEN equipment—designed and built to solve a specific problem—helped them achieve faster, more efficient production at lower cost. See how KOVEN's vast resources and over 70 years accumulated experience can help your plant toward speedier, more economical output. Call or write today for a consultation with a trained KOVEN representative. No obligation. Send for Bulletin #550.

Specialists in intricate fabrication using:

stainless steel

monel nickel

aluminum

inconel all clad materials

Fabrication to all A.S.M.E. Codes

L. O. KOVEN & BRO., INC. 154-E Ogden Ave., Jersey City 7, N. J.

\*\*\*\*\*\*\*\*\*

X-Ray Inspection

FOR QUALITY CONTROL

KOVEN equipment in all metals and alloys include: High pressure vessels, extractors, mixers, stills, kettles, tanks, stacks, breechings. Shop and field erected storage tanks to 2 million gallons. High vacuum testing. PLANTS:



Jersey City, N. J.



Dover, N.



When inquiring check CP 8813 opposite last page



Only as "OPEN" as the valve's port opening! If the opening is smaller than the pipe ... then a valve cannot be COMPLETELY "OPEN" in any position! For a really "OPEN" flow...specify

QCf Rectangular Port Valves. With a port opening the same area as the pipe itself ... they assure smooth-running, trouble-free operation by keeping down turbulence and harmful abrasive action caused by solids in suspension. They also minimize loss of head pressure ... especially important when handling the extra heavy fluids used in the processing industries.

And, of course, all QCf Cylindrical Lubricated Plug Valves...with rectangular or round port openings...feature "split-second" shut off, TEFLON\* head gaskets, and many other design advantages. Representatives in 50 Principal Cities.

Write for descriptive Catalog 8-CP, QCf Industries, Incorporated, Valve Division, 1501 E. Ferry Avenue, Detroit 11, Michigan.

QCf Plug Valves are backed up by Proof-of-Performance in every Processing Industry.

QCf !



When inquiring check CP 8814 opposite last page

#### ENGINEERING & MAINTENANCE

#### **Tabulates resistance of cements**

Specification-data sheet of four pages is devoted to descriptive tabulation of company's technical cements and bonding compounds. Products' resistance to water, acids, alkalis, oils, heat, and electricity are included.

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Specification and data sheet on technical cements and bonding compounds is issued by Sauereisen Cements Company, Dept. CP, 1049 N. Canal St., Pittsburgh 15, Pa. When inquiring specify CP 8815 on handy form opposite last page.

#### Record capacity for its weight offered by aluminum gas meter . . .

designed for pressures to 100 psi, unit weighs only 176 lb, is 33 x 27 x 19"

Intended for commercial and industrial services. large-capacity aluminum gas meter weighs only 176 lb as compared with 600 lb for company's cast iron meter of same capacity and working pressure.

Designed for working pressures up to 100 psi, its overall dimensions are only 33 x 27 x 19". This allows it to be easily moved through doors, windows, and up and down narrow stairways for sub-basement installations.

Meter can accommodate flows of up to 2250 cfh at 1/2" we pressure loss and 5000 cfh at 2" we pressure loss when handling 0.60 sp gr gas.

Stainless steel inserts provide corrosion-resistant wearable threads in index plate holes on cover, four capscrew soles at ends of body, in inlet and outlet.

Meter is also equipped with steel feet, 1/2" high, for insulation. All internal parts of aluminum meter are interchangeable with those of cast iron counterpart.

(No. 4 aluminum gas meter is a product of Meter and Valve Division, Rockwell Manufacturing Company, Dept. CP, 400 N. Lexington Avenue, Pittsburgh 8, Pa. . . . or for more information check CP 8816 on handy form opposite last page.)

#### Full construction details given on evaporative condensers

Design of evaporative condensers is explained with a cut-away illustration and full construction details in 8-page catalog. Included are performance curves for selecting units to use with either Freon or ammonia. Units described have capacities ranging from 10 to 150 tons at 78°F wet bulb.

Cat 500 is available from Acme Industries, Inc., Dept. CP, 600 N. Mechanic St., Jackson, Michigan. Specify CP 8817 opposite last page.

#### Welding, precise fitting unnecessary with steel fittings, couplings

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Uses: Especially suited to chemical plants requiring quick assembly and disassembly of light stainless steel pipe lines for permanent or temporary use.



Fittings are offered in either Type 304 or 316 stainless

Features: With these low-cost stainless fittings and couplings no welding or precision pipe fitting is required.

Description: All fittings have flared stainless steel sleeve (tee, elbow, cross, or reducer). Either Type 304 or 316 stainless is available.

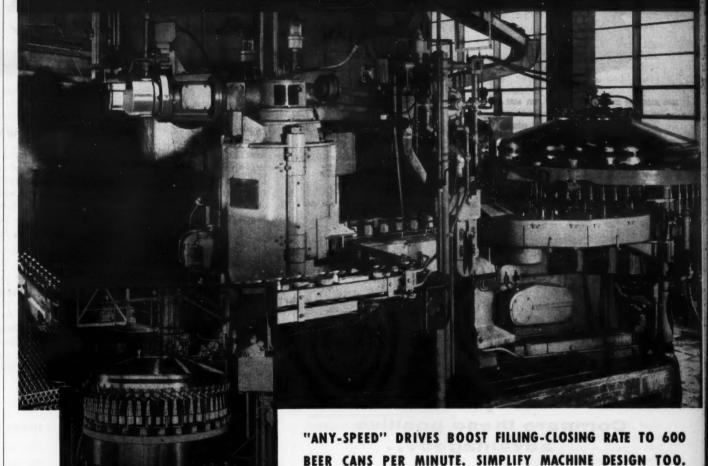
Connections are made with triple sealing gaskets and pressed mild steel channel flanges with bolts. Only sleeve and neoprene rubber contact fluid in pipe. Construction of coupling allows for deflection, misalignment, expansion, and contraction between two joined pipes while maintaining 500 to 1000 psi hydrostatic pressures.

Fittings and couplings are available in all sizes from 3/4 to 12".

(Stainless steel fittings and couplings are products of R. H. Baker & Co., Inc., Dept. CP, 2070 East Slauson Ave., Huntington Park, California . . . or for more information check CP 8818 on convenient Reader Service slip which is located opposite last page.)

For more information on product at right, specify CP 8819
. . . see information request blank opposite last page.

# You too can discover THE WAY UP IS OILGEAR



Beer Can Filling and Closing Machines equipped with Oilgear "ANY-SPEED" Drives are operating in many breweries. With Oilgear, beer can filling and closing production climbed from 360 to 600 cans a minute.



FOR FLUID POWER

PUMPS, MOTORS, TRANSMISSIONS, CYLINDERS & VALVES

There is a necessity upon every machine designer to improve the performance of plication of power pl his machines—if he can. When the deprotection against he

designer to improve the performance of his machines—if he can. When the designers of beer-can filling and closing machines raised the rate from 150 to 360 cans per minute, the drive limit seemed to be reached. Yet, their users wanted more production without spillage or can conveyor problems.

Then these engineers tried Oilgear "ANY-SPEED" Drives... the Fluid Power and Control that gave them what they wanted and—even more.

These engineers stipulated: • accelerate machines to half speed in 2 seconds • accelerate machines to full speed in 5 seconds • decelerate and stop machines in 4/10 seconds • a filling-closing rate of 425 cans per minute.

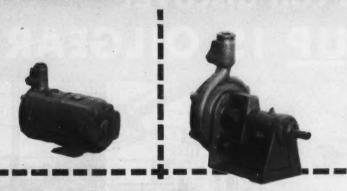
The Oilgear drive accelerated and decelerated so smoothly, it actually provided: • acceleration to full speed in 2 seconds • deceleration and stop in 2/10 seconds • a filling-closing rate of 600 cans per minute.

That's not all. Oilgear's cushioned application of power plus inherent positive protection against high overload starting torques and lower overload running torques eliminated the need of mechanical slip clutches. Thus, the machine design is simplified and maintenance is negligible.

This smooth yet swift acceleration and deceleration that allows brewers to handle full cans without spilling is one of two tremendously important Oilgear advantages. Utterly variable, flexible and controllable speed is the other. These and other superiorities are writing new history in machine design. You ought to know the details of that history. Why don't you contact a nearby Oilgear engineer, or write to Milwaukee. No cost, but the profits may be great.

#### THE OILGEAR COMPANY

1583 W. Pierce Street Milwaukee 4, Wisconsin



# OLIVER Type L Centrifugal Pumps





# Compare these positive advantages . . .

**Self-venting** — high cut-water keeps air out . . . simplifies priming . . . holds prime better when pump is in operation.

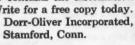
Simple piping — inlet and outlet connections in same vertical plane.

Large diameter impeller — single shroud type for high efficiency.

**Corrosion resistant** — all contact parts in 1" size constructed of Carpenter 20 stainless... $1\frac{1}{4}$ ",  $1\frac{1}{2}$ " and 2" in Carpenter 20 or No. 316 stainless, bronze or cast iron.

Interchangeable — all parts on 1½" and 2" sizes are interchangeable except for casing, cover and impeller.

This new pump is now available in four standard sizes. Bulletin No. 310 contains the information you'll want to have. Write for a free copy today.







When inquiring check CP 8820 opposite last page

# briefs

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#### The Freens

Results of an extensive study of the properties of Freon refrigerants are presented. Data on resistivity and dielectric constant are included. Effects of Freons on insulation of hermetic systems is reported. Thirteen pages, 10 tables, 5 figures, 3 references. ("Refrigerating Engineering," April, 1955, page 61.)

#### Protection of pipes

Current requirements for cathodic protection of pipe lines is discussed. Attention is given to isolation factors, trial-and-error methods, and measurement of electrical characteristics. Seven pages, 6 figures, one reference. ("Corrosion," April, 1955, page 51.)

#### Communications

Vannevar Bush makes a good case for the importance of communications and points out how deficient some present methods are. The procedures that attend letter writing are largely archaic, he points out. Three pages. ("Mechanical Engineering," April, 1955, page 302.)

#### Air pollution

In an eight-paper symposium on air pollution the following topics are developed: modern electrical precipitation, fly ash separators, collection of high-resistivity dusts, mechanical electrostatic charging of fabrics for air filters, catalytic reactivation of carbon in purification systems, filtration of hot gases, photochemical oxidation of sulfur dioxide in air, and air pollution literature. Fortynine pages. ("Industrial and Engineering Chemistry," May, 1955, page 931.)

#### Drying of grain

A rapid method for determining rates of flow of air in grain-drying structures of non-rectangular cross section is given. When used with a chart for wheat, only the distance between static pressure lines is needed. Three pages. ("Agricultural Engineering,". April, 1955, page 247.)

#### Synthetic fibers in paper

Paper from synthetic fibers offers properties not possible in cellulosic papers. Fiber-to-fiber bonding, fiber properties, and dimensional stability are considered. Five pages, seven tables. ("Tappi," May, 1955, p. 257.)

#### Smoke abatement

From England come abstracts from a paper that deals with smoke abatement in practice. Combustion of coal, coke, and gas is covered. Three pages. (Gas World," April 16, 1955, page 1004.)

#### Reading technical journals

Maximum value from technical magazines can be obtained through following suggestions that deal with selectivity, reader service, and participation. Three pages. ("Power," May, 1955, page 100.)

#### Moisture determination

Paper describes a continuous-flow device for measurement of moisture in transformer oils and other liquids. Use is made of a megohmmeter and a calibration curve. ("Electrical Engineering," May, 1955, page 416.) abstracts of pertinent articles in other industrial publications . . . selected by CP editors as a service for you . . .

#### Padlockina

A well-chosen system of padlocks and keys can aid materially in protecting industrial plants. Switchboxes padlocked separately by each maintenance man at work offers the only positive protective measure. ("Plant Engineering," April, 1955, page 95.)

Plaster of Paris

At 21°C the hemihydrate of calcium sulfate labeled with Ca-45 or S-35 was hydrated in a supersaturated solution of calcium sulfate. Measurements of distribution of radioactive isotopes were made, and mechanism of the hydration was studied. ("Canadian Journal of Chemistry," May, 1955, page 870.)

#### Alkaline pulping

A new concept of the mechanism of alkaline pulping, opposed to the usual penetration theory, is presented. Delignification is accomplished by a reaction interface that moves toward center of the chips. Alkali does not penetrate chips ahead of interface; preevacuation prior to cooking does not increase depth of delignification. Ten pages, two tables, 13 figures, 30 references. ("Paper Industry," May, 1955, page 142.)

#### Depreciation

Depreciation as an economic concept of interest to consultants is discussed under heading of expense, when to replace old assets, book values, accounting vs economic depreciation, and effect of technological progress. Three pages. ("Consulting Engineer," May, 1955, page 44.)

#### Heat transfer

Heat transfer coefficients in horizontal evaporators are presented in tabular form. Significant correlations are made. Eleven pages, three tables, 13 figures. ("Refrigerating Engineering," May, 1955, page 36.)

#### **Thioacetamide**

Uses of thioacetamide in qualitative and quantitative analysis are outlined. Advantages in cost and safety over hydrogen sulfide are discussed. ("Iournal of Chemical Education," May, 1955, page 258.)

#### Pollution of air

Effective control of pollution of air from iron foundries depends upon type and size of furnaces. Methods of control can reduce contamination by as much as 95 per cent. Three pages, two tables, three photographs. ("Iron Age," May 5, 1955, page 110.)

#### **Acid-forming fertilizers**

Practical information on acid-forming fertilizers covers ammonium sulfate, urea, ammonium phosphate, ammonium nitrate, and anhydrous ammonia. ("Agricultural Chemicals," May, 1955, page 43.)

#### **Brazing alloys**

Properties of metallurgical phases of Ag-Cd-Cu-Zn quarternary alloys are presented and discussed. Four pages, 10 figures, nine references. ("Welding Journal," May, 1955, page 421.)

#### Length of cotton fibers

The distribution of cotton fiber length constitutes an important quality factor. An excessive number of short fibers results in waste, uneven rovings, weak yarns, and inefficient spinning. ("Textile Research Journal," May, 1955, page 422.)

# Performing Seal!

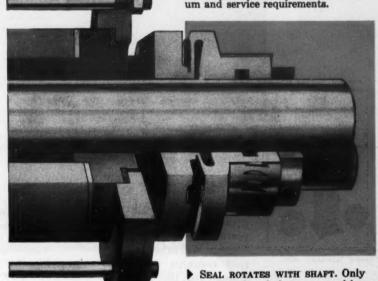


Pump difficult chemicals...with droptight service over longer periods of time. That is what Chemiseal's chemically impervious TEFLON, pressurebalanced bellows design offers you.

The ideal Mechanical Seal that has no equal in handling acids, alkalies, solvents, hydrocarbons, alcoholsclear liquids, slurries and tarry materials.

#### FEATURES

CHEMICALLY IMPERVIOUS TEFLON Bellows Section. A selection of seal face materials dependent upon medium and service requirements.



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bearing surface is between precision ground rotating and stationary seal faces. Low friction load on shaft. Lower power cost. Drop tight service.

- No scoring of shafts and Chemiseals work satisfactorily on shafts previously scored by other seals or packing.
- PRESSURES at the seal up to 100 psi at 75°C or 75 psi at 100°C.
- Sizes from 1/8" to 21/8". Other sizes for special applications.
- MAXIMUM LENGTH, all seals 23/4".

Write for Bulletin No. MS-954.

UNITED STATES GASKET COMPANY, CAMDEN 1, NEW JERSEY



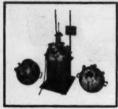
Representatives in principal cities throughout the world

When inquiring check CP 8821 opposite last page

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# METAL EQUIPMENT for CHEMICAL PROCESSING Custom Made by GLASCO

Jacketed stainless steel



Special laboratory stills.



Overhead hoppers.

Many of the country's great Chemical, Pharmaceutical, Soap, Rubber, Plastics, and other industrial concerns come to Glasco for the fabrication of metal processing equipment because:

- GLASCO works constantly in stainless steel, monel, and other non-corrosive metals.
- GLASCO engineers and fabricators not only work to customer's blue prints or specifications, but also offer a complete design and engineering service.
- The range of GLASCO products includes every type of equipment, from standard trays and trucks to the largest and most intricate units; also special equipment in which heat transfer or pressure are concerned.
- GLASCO meets all ASME requirements.

Write for free folder "Metal Equipment for Processing of Chemicals and Pharmacouticals".



When inquiring check GP 8822 opposite last page

# new literature

# Catalogs valves for plumbing and heating

Fifty-five kinds of valves for the plumbing and heating industry are presented in eight-page catalog. Listed with descriptions, sizes, and weights are gate, angle, globe, foot, needle point, and relief valves, manifold header units, strainers, and many others.

Cat B255 is issued by Milwaukee Valve Company, a subsidiary of A-P Controls Corp., Dept. CP, 2375 S. Burrell St., Milwaukee 7, Wis. When inquiring specify CP 8823 on handy form opposite last page.

# Describes heavy-duty, remote-bulb temperature controller

Suggesting ideas for application, two-page bulletin in two colors lists performance specifications for remote-bulb, adjustable temperature controller. Controller is available for two temperature ranges, 60 to 250°F and 200 to 550°F. Contacts are rated at 35 amp at 120v AC. Bulb sizes, capillary lengths, and various modifications are described.

Bul MC-121 is issued by Fenwal Inc., Dept. CP, 243 Pleasant Street, Ashland, Mass. When inquiring check CP 8824 opposite last page.

#### Economical labeler described

Fully-automatic, continuous low-cost labeling of products packed in glass is described and illustrated in four-page bulletin. Specific unit pictured and detailed will handle containers from one to four inches in diameter and from three to thirteen inches high. It is available in two models: one for labeling 60 to 75 containers per minute, other for 120 to 140 containers per minute.

Bul TU-170 is available from Economic Machinery Co., Div. of Geo. J. Meyer Mfg. Co., Dept. CP, 40 Fremont St., Worcester, Mass. Specify CP 8825 opposite last page.

Industrial bulletins pertinent to the reader . . . offering data on products, processes, services

# Wall chart shows over 120 syntheses based on o-nitrochlorobenzene

More than 120 organic syntheses based on o-nitrochlorobenzene are shown on 35 x 44" wall chart. Reactions include ring substitutions, chloro reactions, and nitro reactions. Nineteen potential uses for derivatives are shown.

ONCB wall chart is available from Organic Chemicals Div., Monsanto Chemical Co., Dept. CP, 800 N. Twelfth Blvd., St. Louis 1, Mo. When inquiring specify CP 8826 on handy form opposite last page.

# Describes electronic system for process control

Illustrating components of all-electronic control system, four-page bulletin in two colors gives brief description of function of each unit. References are included to other bulletins explaining components in more detail. Typical schematic diagram indicates use in measuring and controlling temperature, pressure, liquid-level. Input from primary sensing element is 0.0 to 0.500v AC, regardless of process variable controlled. System is called "Autronic Control."

Bul A1.3-1 is issued by The Swartwout Company, Dept. CP, 18511 Euclid Ave., Cleveland 12, Ohio. Specify CP 8827 opposite last page.

#### Using dispersed sodium

Advantages, demonstrated uses, preparation and handling of sodium dispersions are described in 28-page illustrated booklet. Dispersions contain Na in an inert media, plus dispersing agents which permit small particle size, increase stability, prolong storage life, and improve ease of handling.

"Using 'Ethyl' Sodium in Dispersed Form" is issued by Ethyl Corp., Dept. CP, 100 Park Ave., New York 17, N.Y. When inquiring specify CP 8828 on handy form opposite last page.

# Corrosion resistance of Cu-Ni alloys

Twelve-page reprint entitled "Corrosion Resistance of Cupronickel Alloys Containing 10-30% Nickel"gives tabular data on performance in specific services in various industrial fields of these alloys.

It is available from The International Nickel Co., Inc., Dept. CP, 67 Wall St., New York 5, N.Y. When inquiring specify CP 8829 on handy form opposite last page.

# Lists properties and characteristics of primary, secondary amines

Cationic surface-active agents finding application in paint, oil, rubber, chemical, and textile fields are subject of eight-page booklet. Properties and characteristics of the primary and secondary amines are given.

"Armeens" is issued by Chemical Div., Armour & Co., Dept. CP, 1355 W. 31st St., Chicago 9, Ill. When inquiring specify CP 8830 on handy form opposite last page.

## Miniature basic switches — data on complete line

Describing ten classifications of standard line of miniature switches, 28-page, two-color catalog has over 400 listings of basic switches, auxiliary actuators, and terminal enclosures. Basic switches have three primary uses — limit, control, and safety. Catalog is complete with photographs, dimension drawings, terminal variations, electrical ratings. Description of other literature issued by manufacturer is included.

Cat 62 is issued by Micro-Switch Div., Minneapolis-Honeywell Regulator Co., Dept. CP, Freeport, Ill. When inquiring specify CP 8831 on handy form opposite last page.

#### Fills and seals plastic tubes

Filling and sealing machine designed to handle Bradley Container Corporation's Bracon tubes is described in four-page bulletin. An 11- and a 22-station model are illustrated. Units discussed are automatic and adaptable for filling and sealing metal tubes, bottles and jars.

Bulletin on Saga filling and sealing machines is issued by A & M Tool & Die Co., Inc., Dept. CP, Foster Street, Southbridge, Mass. When inquiring specify CP 8832 opposite last page.



Selection of the proper grade of stainless steel tubing is essential because no single metal or alloy economically resists all corrosive conditions. As certain physical properties are required for specific applications, sometimes the consideration of corrosion resistance is neglected when the choice of tubing material is made. For example, if a degree of corrosion resistance can be imparted to ordinary steel by the use of a protective coating, and if replacement cost of the article is low, this may be the sensible course.

But where replacement cost is high, or where contamination through corrosion may occur, the wisest, and in the long run the most economical choice of tubing, is a stainless steel of the correct analysis for the conditions of manufacture and service.

Get in touch with Mr. Tubes, your link to B&W, for a detailed comparison of grades suitable for your use and learn how to get more for your money with stainless. Or write for Bulletin TDC- 160CP.



THE BABCOCK & WILCOX COMPANY TUBULAR PRODUCTS DIVISION Bower Fells, Pr., and Allfornation, Wh.; Soundare Tobing Wilder Steinbase Steal Tobing Afficience, Obic: Wolford Carbon Steal Tobing Milwoodles, Will; Soundare Wolford Pinton

TA-3037(P)

When inquiring check CP 8833 opposite last page



# 25 EXPOSITION OF CHEMICAL INDUSTRIES

COMMERCIAL MUSEUM and CONVENTION HALL

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If you're a chemist . . . chemical engineer . . . production man . . . executive—there's no better, no easier way for you to keep up with today's developments than by taking time out to visit this important exposition! Over 500 informative exhibits throw the spotlight on the new facts, ideas, materials and methods that you must have at your fingertips.

At no other exposition in the country can you see so complete a display of the newest materials, supplies and equipment to serve the chemical processing industries. Hundreds of experienced technical representatives at the stimulating exhibits will bring you up to date on the newest processing methods. Just a single idea picked up at this year's great EXPOSITION can profit you over and over again!

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MANAGEMENT: INTERNATIONAL EXPOSITION COMPANY
480 Lexington Avenue, New York 17, N. Y.

When inquiring check CP 8834 opposite last page

#### NEW LITERATURE

# Shows incentive awards for safety

Folder of four pages illustrates no-accident award pins for safety incentive programs. Pins bear the National Safety Council name and are finished in red, green, and



I stabbed myself putting on my no-accident award pin

white enamel. Pins show individual years from one to 40 which have been worked without accident. There is space on pin for company name as well.

Folder also shows other awards such as lighters, bracelets, key chains, tie bars, money clips, etc. All awards bear the National Safety Council emblem. Quantity price list is included as well as illustrations of the various awards in full color.

No-accident Award folder is issued by the National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill. When inquiring specify CP 8835 on handy form opposite last page.

## Color pastes for resins

Technical bulletin of two pages describes 19 basic color pastes for molders of epoxy, thiokol, isocyanate, and polyurethane resins.

Bul No. 130 is issued by Claremont Pigment Dispersion Corp., Dept. CP, 110 Wallabout St., Brooklyn 11, N.Y. Specify CP 8836 opposite last page.

# FREE

# BULLETIN

How to set new highs in precision measurement of low temperatures



This special low-temperature Alnor Pyrometer is invaluable for balancing hot water heating systems, checking floor, wall or ceiling temperatures in panel heating systems, measuring temperature of refrigerated coils, insulation and all other low temperatures. Sturdy and completely portable, the Type 2300 can be taken anywhere—and give precise, direct readings in from 3 to 5 seconds.

Teer out this ad and attach it to your letterhead, Mail to Illinois Testing Laboratories, Inc., Room 504, 420 North La Salle Street, Chicago 10, Illinois.



#### PRECISION INSTRUMENTS FOR EVERY INDUSTRY

When inquiring check CP 8837 opposite last page

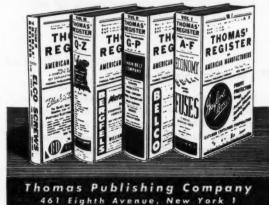
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When inquiring check CP 8838 opposite last page

#### Shows how pressure tubing made of nylon is used

Flexible nylon pressure tubing that's tough, won't corrode, and serves over a wide temp range is subject of six-page data folder. Description, applications, features, cost, and installation data round

"Nylaflow Tubing" is issued by The Polymer Corp. of Penna., Dept. CP, 400 Walnut St., Reading, Pa. When inquiring specify CP 8839 on handy form opposite last page.

#### Infrared sampling accessories for spectrometers listed

Describing sampling accessories for infrared spectroscopy, four-page bulletin in two colors also includes description of infrared microscope attachment.

Among accessories discussed for use with manufacturer's spectrometers are standard, liquid, and solid cells, sealed liquid absorption cells. standard gas cells, variable-space liquid cells. Console and viewing cabinet are also described.

Bul FD-42-954 is issued by The Perkin-Elmer Corporation, Dept. CP, Norwalk, Conn. When inquiring specify CP 8840 opposite last page.

#### Lists aluminum paints for metal, wood, hot surfaces

ge

Aluminum coatings having maximum luster and giving lasting protection under severe conditions are listed on illustrated data sheet. Four types designed for wood, metal, high temperatures, and high moisture and fumes - are described.

"Aluminum Paints" is issued by The Arco Co., Dept. CP, 7301 Bessemer Ave., Cleveland 27, Ohio. Specify CP 8841 opposite last page.

#### Shows characteristics, features of vinyl acetate emulsions

Characteristics, features, and applications of Darex polyvinyl acetate polymers and copolymers are covered in folder. Comparison of total solids, viscosity, blocking temp, molecular weight, and other properties of eight emulsions are presented in tabular form.

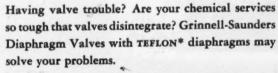
Bul E-12 is issued by Dept. 12A, Dewey & Almy Chemical Co., Div. of W.R. Grace & Co., Dept. CP, 62 Whittemore Ave., Cambridge 40, Mass. Specify CP 8842 opposite last page.

# Unaffected by all chemicals normally found in industry

Diaphragms

for GRINNELL-SAUNDERS

DIAPHRAGM VALVES

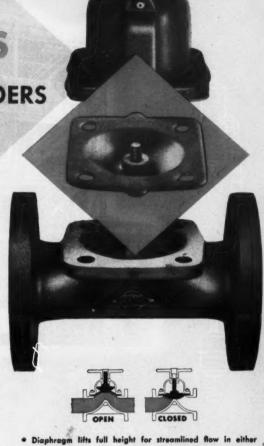


Grinnell TEFLON diaphragms are made by a new and unique process which produces a better product of greater density, toughness and flex life. TEFLON offers a high degree of chemical inertness to all chemicals normally found in industry.

Grinnell-Saunders Diaphragm Valves are available with bodies of iron, bronze, stainless steel, cast steel, aluminum, Monel, Saran, Durimet; and with body linings of glass, lead, soft or hard rubber, neoprene, Saran. Diaphragm life depends on temperature, pressure, and frequency of operation. Your inquiries, which should be accompanied by complete service data, will receive prompt attention.

\*Registered Trade-Mark, E. I. du Pont de Nemours & Company, for its tetrafluoroethylene resin.

Grinnell Company, Inc., Providence, Rhade Island



- Resilient diaphragm assures positive, leak-tight closure even with grit or scale in the line
- Diaphragm absolutely isolates working parts from fluid sticking, clogging, contamination, corrosion eliminated
- · Body, lining, and diaphragm materials to suit service
- · Simple maintenance. Diaphragm can be replaced easily without removing valve from line. No packing glands to demand attention. No metal-to-metal seats to become damaged or

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When inquiring check CP 8843 opposite last page

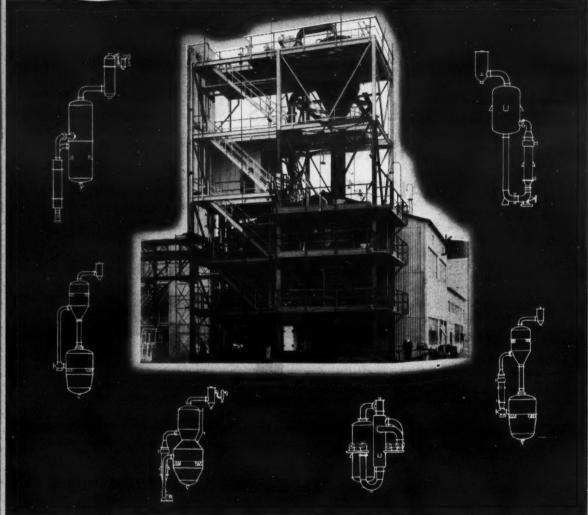
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# Crystallizers\* of All Types ...

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STRUTHERS WELLS CORP. WARREN, PA.

Plants in Warren and Titusville, Pa.-U.S.A.

\*Patented and Patents Pending

When inquiring check CP 8844 opposite last page

#### NEW LITERATURE

# Advantages of flame photometer for analysis of alkalis

Advantages of using flame photometer for analysis of alkali metals in solution are described in four-page three-color bulletin. Relatively untrained personnel can operate the instrument under skilled supervision. Sample size required is five cc or less per determination and an analysis can be performed in about two minutes per element. Diagram of atomizer-burner assembly is shown.

Bul FD63-255 is available from The Perkin-Elmer Corporation, Dept. CP, 870 Main Ave., Norwalk, Conn. When inquiring specify CP 8845 on handy form opposite last page.

# How to handle adhesives for transparent films

Emulsion, lacquer, hot-melt, and solvent activator adhesives for transparent films are subject of 16-page pocket-size booklet. Included is a 17 x 20" fold-out chart listing types, identification, manufacturers, trade name, gages, and characteristics of principal transparent films.

"How to Handle Adhesives for Transparent Films" is issued by National Adhesives, Div. of National Starch Products Inc., Dept. CP, 270 Madison Ave., New York 16, N.Y. When inquiring specify CP 8846 on handy form opposite last page.

#### Discusses DC amplifier system for precise control

Catalog of 12 pages illustrates and describes direct-current amplifier system for low-level measurement and control. System is mentioned as particularly suited to industrial and laboratory processes requiring reliable service, high stability and sensitivity with extreme accuracy.

Suggested applications include temperature control requiring precise regulation, high-speed measurement of magnetic flux, pulse energy, photographic exposure, welding currents, or any temperature differential indication of about 2°C readable to 0.02°C.

Basic unit of the system, the DC amplifier, is essentially an automatic potentiometer. Brief descriptions of other units in the system are given.

Cat B-36-A-3-55 is issued by Weston Electrical Instrument Corp., Dept. CP, 614 Frelinghuysen Ave., Newark 5, N. J. When inquiring specify CP 8847 on handy form opposite last page.

AUG

## Describes designation system for wrought aluminum

Pamphlet of four pages describes, in tabular form, the alloy designation system developed by The Aluminum Association for wrought aluminum and aluminum alloy products.

"Alloy Designation System for Wrought Aluminum" is available from Reynolds Metals Company, Dept. CP, 2500 S. Third St., Louisville 1, Kentucky. Specify CP 8848 opposite last page.

## Discusses tube-to-sheet welding for heat exchangers

An extensive discussion of tube-to-tube sheet welding for heat exchangers is featured in 22page publication. Techniques made necessary by increasing service requirements and difficult materials are stressed.

Welding process table illustrating filler metals and methods used with different materials, and weld drawings and photomicrographs are included. Text covers design considerations, materials, procedure evaluation and training, processes, stress reduction and stress-reduction tests.

"Alco Products Review", Spring, 1955, is available from American Locomotive Company, Dept. CP, Box 1065, Schenectady 1, N. Y. When inquiring specify CP 8849 opposite last page.

# Tells how to select right ball mill

In addition to describing complete line of ball and pebble mills, 42-page catalog explains theoretical and practical aspects of operation, and gives helpful hints for grinding. Illustrated with photographs, drawings, and tables, literature tells how to select the right size mill and also shows typical installations, serves as handy reference manual. Cat Y is issued by Paul O. Abbe, Inc., Dept. CP, 152 Center Avenue, Little Falls, New Jersey.

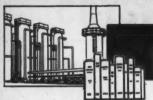
When inquiring check CP 8850 opp. last page.

# Last-stage peroxide bleaching of alkaline pulps discussed

Use of H<sub>2</sub>O<sub>2</sub> as a final-stage treatment in bleaching kraft and soda pulp is discussed in 7-page Bul No. 64 available from Becco Chemical Div., Food Machinery & Chemical Corp., Dept. CP, Station B, Buffalo 7, N.Y. When inquiring specify CP 8851 on handy form opposite last page.



When inquiring check CP 8852 opposite last page



# processing and engineering data

127a

#### **Depreciation of Capital Investment**

By CHEMICAL PROCESSING Editors
FRANK McELROY and BRUCE FADER

Depreciation of capital investment, whether it be a single unit or a plant, can be done in any number of ways. One of the simplest methods is "straight line amortization." However, when such considerations as taxes, insurance, and a fair return (or interest charge) are taken into account, calculation of equal annual payments becomes involved. The problem, therefore, is to determine whether the unit will show an attractive saving after the charges have been assessed to it.

With simple interest, total cost of investment, expressed as an average amount per year is:1

Average annual cost = I(A+B+D)

Where:

I = investment (total cost, in place and ready to run)

A = average allowance for return on investment

A¹ = proper annual percentage return on net depreciated investment (includes a normal profit and interest on borrowed funds, if any)

B = average allowance for taxes and insurance throughout estimated life of units

B1 = proper annual percentage allowance on net depreciated

D = Annual percentage allowance for depreciation and obsolescence

= 1/N, where N equals years depreciation This equation can be changed to

Average annual cost = 
$$\left[A'+B'+\frac{2}{N+1}\right]\left[\frac{N+1}{2N}\right]I$$

and be solved readily by the nomograph.

Return on investment (including interest on borrowed funds, if any) to tax and insurance rate on the particular investment. To this is added the "depreciation function" (from the table) corresponding to the number of years over which the investment will be depreciated. (Depreciation function is (2/N + 1 in) equation above.)

The sum of these three is entered on the  $\Sigma$  scale and

aligned through the year scale to the center reference line, and in turn to the investment scale. Average annual cost is read in units and magnitude corresponding to the investment.

Note that no attempt is made to estimate "salvage value less removal costs" as this amount is subject to great variation and wouldn't give any additional advantage to the calculation. Its omission merely reduces slightly the apparent profits of replacement by making a small increase in calculated fixed costs.

Nomograph is valuable in estimating tangible factors, but intangibles must be considered. No replacement method will ever be developed that will not require managerial judgment in making the final decision.

#### Typical Example

Additional capacity is needed, so purchase of an \$85,000 unit is considered. Unit is to be depreciated in 4 years, while earning a 10% annual return on net depreciated investment during this period. Taxes and insurance are taken as 3% on this net investment. Therefore:

#### A'+B'+ Depreciation function 10+3+40=53

Connect 53 on the \(\Sigma\) scale with a straight line to 4 on the Years to Depreciate scale. Mark the intersection on the reference line. Connect this point to 85 on the Investment scale and read 28. Average annual cost is therefore \$28,000. (Mathematical calculation gives \$28,160 — error in using this nomograph does not exceed 2%.)

#### LITERATURE CITED

(1) ALFORD AND BANGS, "Production Handbook," Ronald Press Co., N.Y. (1950) pp. 841-847.

### TABLE DEPRECIATION FUNCTION

(add Year	Function	to the p	er cent taxes, Function	insurance, Year	interest) Function
1	100	9	20	17	11.1
2	67	10	18	18	10.5
3	50	11	16.7	19	10.0
4	40	12	15.4	20	9.5
5	33	13	14.3	21	9.1
6	29	14	13.3	22	8.7
7	25	15	12.5	23	8.3
8	22	16	11.8	24	8.0
				25	7.7

No one
Wants a Product
Wants a Product
Wants a Product
Contaminated with Iron
Contaminated with Iron
Your best reason
for installing
FEREO FILTER

# **Magnetic Separators**

You can imagine (or maybe you know from personal experience) how iron contamination affects dyestuffs, for instance, or foods or drug products.

There's no need to gamble with the purity and quality of your product. Frantz FERROFILTERS remove contaminating ferrous particles from liquids and slurries by magnetic action with a maximum of efficiency and a minimum of cost.

That is why hundreds of plants in the process industries are using them to improve their products; eliminate customer complaints; and increase their sales and profits.



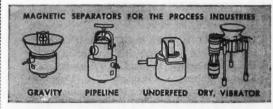
PIPELINE FERROFILTER

46-E stallation tables of help you UNDERFEED FERROFILTER

Send for BULLETIN 46-E with full operating and installation data. Full descriptions, tables of sizes and capacities will help you select FERROFILTER best suited for your job.

#### S. G. FRANTZ CO., Inc.

Brunswick Pike & Kline Ave. P. O. Box 1138, Trenton 6, N.J. TRAIL OFFER
Liberal rental plan
that gives you a lewcest opportunity to
prove FERROFILTER efficiency. Write for



When inquiring check CP 8853 opposite last page CHEMICAL PROCESSING

Chemical Processing — August, 1955

1110

# Describes polarized DC relay operating on 50-mw input

Describing manufacturer's line of polarized DC relays, four-page bulletin includes engineering data on unit. Installation dimensions are given. DC relay is ultra-sensitive, capable of operating on input power as low as 50 mw. Among suggested uses is null detection in automatic control systems using resistance bridge circuits.

Relay also operates in electronic plate circuits for comparing currents or detecting differences between two voltages. Current generating photocell will provide sufficient power to operate the relays — known as "micropositioners."

Bul F 3961-4 is issued by the Barber-Colman Co., Dept. CP, 1300 Rock St., Rockford, Ill. When inquiring specify CP 8854 on handy form opposite last page.

# Simplified explanation covers absorption refrigerating

Catalog of 36 pages gives simplified explanation of absorption refrigerating machines which accomplish large-capacity cooling from steam and use plain water as a refrigerant. Important features of unit are illustrated. Capacity ratings are tabulated and physical characteristics are shown in chart form.

"Absorption Refrigerating Machines" is available from Carrier Corporation, Dept. CP, 300 S. Geddes St., Syracuse, New York. When inquiring reader may simply check CP 8855 on the convenient Reader Service slip opposite last page.

# Illustrated "thumbnail" course in gamma radiography

Presenting basic information required for setting up or operating gamma-radiography installations, 12-page booklet tells how to select proper radioisotope and discusses radiation safety. Three available artificially-produced radioisotopes—cobalt-60, cesium-137, iridium-192—are discussed and compared.

Requirements for equipment installation are briefly covered. Panoramic technique is discussed together with directional projection. Fundamental terms are defined; additional study material is suggested.

Bul 355-S is issued by Technical Operations, Inc., Dept. CP, 6 Schouler Court, Arlington, Mass. When inquiring specify CP 8856 on handy form opposite last page.

# buy quality ...in a filter buy Sparkler

# ... and collect cash dividends in labor savings and operating economies

This Sparkler MCR rectractable tank filter is saving \$24,000.00 a year in labor alone for a large midwest brewery. Every installation of this filter has resulted in lower cost filtering.

The retractable tank idea eliminates the time wasted in breaking pipe connections or outlet seal in opening filter. Fast manipulation with resulting labor saving is a distinctive feature of the MCR filter.

The smooth hydraulic power mechanism simplifies controls to practically a push button operation.

The exclusive Sparkler MCR plate design produces exceptionally high flow rates with unmatched durability.

When you buy a Sparkler MCR retractable tank filter, and see it operate, you have that comfortable assurance you have the best, and most economical, in a heavy duty filter.

10 sq. ft. MCR Models available for sample testing.

Mail coupon for details today or phone at our expense.



# Sparkler Manufacturing Company Mundelein, Illinois Phone: Mundelein 6-6430

Manufacturing plants in Canada, Holland, Italy, Australia. Service representatives in principal cities throughout the world.

SPARKLER	MANUFACTURING	COMPANY
Mundelein	Illinois	

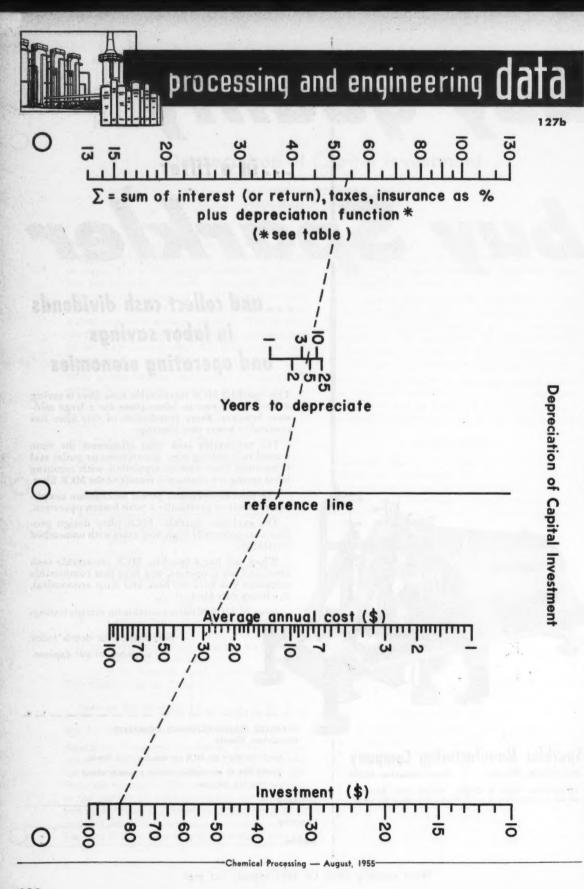
- Send literature on MCR retractable tank filters.
- ─ Would like to see representative engineer about our filtering problem.

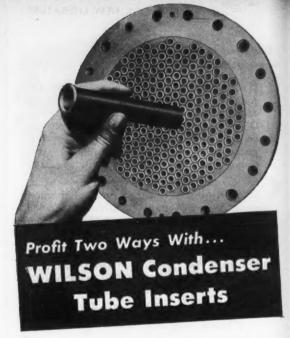
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Company

Address

When inquiring check CP 8857 opposite last page





### Put Equipment Back on Line Faster

You save man-hours and money with new Wilson Condenser Tube Inserts because they eliminate the need to plug. off leaking condenser or heat exchanger tubes. Wilson Inserts go in fast...need no cementing... take less time than it does to plug a "bad tube". What's more, these highly efficient inserts put the tube back into operation as in the original design.

#### Multiply Service Life of the Tube

In many cases, condenser tubes usually fail within the first few inches of the inlet. Wilson Condenser Tube Inserts actually restore these leaking tubes to service by sealing the deteriorated portion of the tube. Wilson Inserts also retard or eliminate the effect of inlet end erosion.

Send for Bulletin 500 which gives the full story on timesaving, money-saving Wilson Condenser Tube Inserts.

#### **Wilson Tube Cleaners**

Depend on these powerful, fast-acting cleaners to do a thorough job every time. There's a Wilson cleaner for all types of tube or pipe. All sizes in stock for immediate delivery.

#### **Wilson Tube Expanders**

For re-rolling old tubes or installing new ones. Precision-made to insure firm seating. Self-feeding and parallel expansion for a particular trade.

Representatives in principal cities

THOMAS C. WILSON, INC., 21-11 44th Ave., Long Island City 1, N.Y.
Cable address: "Tubeclean", New York



When inquiring check CP 8858 opposite last page

#### Many package-filling operations performed by one unit

Variety of dry products, both fine and coarse, can be packed in envelopes, bags, bottles, cartons, jars, and tins by unit which delivers 9 to 72 metered fillings per minute. Several models of this package-filling machine are described and illustrated in four-page bulletin.

Bulletin on package-filling machines is issued by Spee-Dee Packaging Machinery Corp., Dept. CP, 1818 West 74th St., Chicago 36, Ill. When inquiring specify CP 8859 on handy form opposite last page.

#### Give information up-to-date on normal butyl benzoate

applications of n-butyl benzoate are presented in Properties, shipping information, solubilities, and four-page technical bulletin F-8109 issued by Carbide & Carbide Chemicals Co., a Div. of Union Carbide & Carbon Corp., Dept. CP, 30 E. 42nd St., New York 17, N.Y. When inquiring specify CP 8860 opposite last page.

#### **Briefs on principal instruments** of manufacturer's line

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Giving short descriptions of manufacturer's principal industrial instruments and equipment, 26page bulletin in two colors includes references to more detailed literature. Instruments are described to indicate, record, control variables from conductivity to viscosity. Panel boards and related instruments, valves, switches, starters, contacters, relays are also described. Industry bulletins and instrumentation data sheets issued by manufacturer are listed by number.

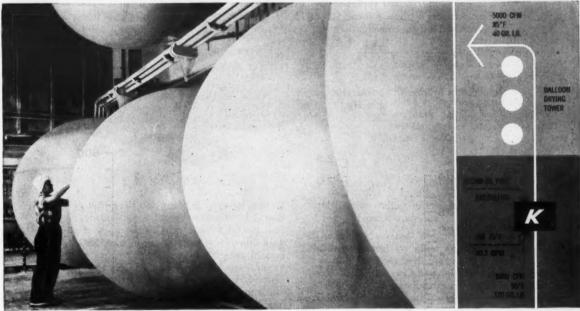
Catalog 5002 is issued by Industrial Division, Minneapolis-Honeywell Regulator Co., Dept. CP, Wayne & Windrim Aves., Philadelphia 44, Pa. When inquiring specify CP 8861 opp. last page.

#### How to apply iron phosphate coatings in preparation for painting

Advantages, action, and procedure for using Crys-Coat iron phosphate prepaint-conditioning coatings are described in 12-page illustrated brochure.

"How to Apply Iron Phosphate Coatings to Steel in Preparation for Painting" is issued by Oakite Products, Inc., Dept. CP, 118F Rector St., New York 6, N.Y. When inquiring specify CP 8862 on handy form opposite last page.

# Dry air saves balloon-maker \$2500/yr.



Low-temperature dry air saves the Dewey and Almy Chemical Company \$2500 or more a year in operating costs. Kathabar humidity conditioning delivers this air for drying weather balloons (see flow diagram) using only 75°F city water and low pressure steam. Dewpoint of the air is reduced from 72.5°F to 43°F without refrigeration!

Compared with standard refrigeration for the same operation, the Kathabar system saves 81¢ an hour in water, steam, and electricity requirements-operating savings of over \$6 per 8-hour day! In addition, the first cost of Kathabar equipment is lower, operation and maintenance are simpler.

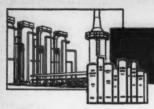
If your operations require low-temperature drying, it will pay you to investigate the many economies of Kathabar humidity conditioning.

write for the complete Dewey & Almy story today



SURFACE COMBUSTION CORPORATION, TOLEDO 1, OHIO

When inquiring check CP 8863 opposite last page



# processing and engineering data

128

#### Solubility of Hydrogen in Iron

By D. S. DAVIS
Professor of Chemical Engineering
Virginia Polytechnic Institute

In connection with a study of the solubility of hydrogen in steel, Armbruster¹ determined solubility of hydrogen in pure iron. His data applies to low pressures and temperatures between 400 and 600°C. This data was correlated by the equation

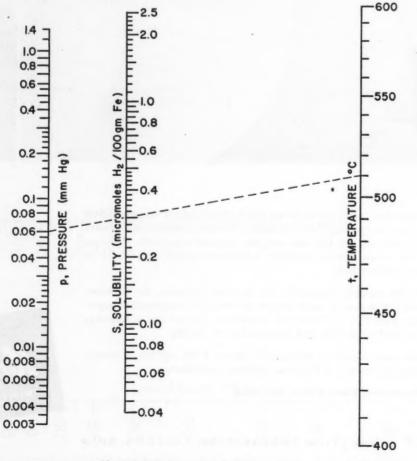
$$\log \frac{s}{p \cdot 0.5} = -\frac{1454}{T - 1.946}$$

 $\begin{array}{ll} s = solubility \ of \ hydrogen \\ p = pressure \\ T = temperature \\ \end{array} \begin{array}{ll} \mu moles/100 \ gm \ FE \\ mm \ Hg \\ ^{\circ}K \end{array}$ 

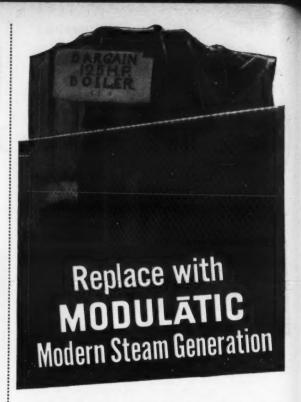
This nomograph, constructed by methods described previously<sup>2,3</sup>, solves equation readily and accurately. Broken line on chart shows that 0.3  $\mu$ moles of hydrogen dissolve in 100 grams of pure iron at a pressure of 0.06 mm and temperature of 510°C.

#### LITERATURE CITED

- (1) ARMBRUSTER, M. H., J Am Chem Soc, Vol 65, p 1043, (1943)
- (2) Davis, D. S., "Empirical Equations and Nomography," Ch. V, McGraw-Hill Book Co., New York (1943)
- (3) Davis, D. S., "Nomography and Empirical Equations," Ch. VI, Reinhold Publishing Corp., New York (1955)



Chemical Processing — August, 1955



This sign-of-the-times points to something important—to new efficiency in steam generation...to new savings in time, in attention—in money—users get with new Modulatic.

Big space-savings, too, for Modulatic takes only about *one-fourth* as much room. Put it anywhere—needs no separate enclosure, expensive foundation or stack . . . ships complete, ready to quickly connect and fire up.

#### SAVES FUEL, WATER

And that's not all! Modulatic makes steam only when you need it, only what you need—automatically, at the touch of a button. It's unequalled for accurate "tracking" of fluctuating load. Over 10,000 already in use for heating, power, processing.

Sizes, 10 to 160 h.p. Pressures, 5 to 300 psi., and even higher when so ordered. Oil, gas, or flip-switch combination. Single or multiple installation with coordinated control.

Wire Vapor Chicago collect today (mention No. 41) for the modern answer to additional steam and complete steam plants backed by 30 years'

development in the world's toughest boiler rooms.



Ask for Bulletin No. 586

#### VAPOR HEATING CORPORATION

80 E. Jackson Blvd., Chicago 4, Illinois In Canada: Vaper Car Heating Co. of Canada, Ltd., 45 Dalhousie St., Mentreel 3

When inquiring check CP 8864 opposite last page

## Valving principle explained in comic book

Company's Shear-seal valving principle is simply explained in comic-strip-form booklet. How valves utilizing this principle operate is further dramatized by cut-out working models and a cross-section.

"Super Seal Explains the Shear-seal Principle" is available from Barksdale Valves, Dept. CP, 5125 Alcoa Ave., Los Angeles 58, Calif. When inquiring check CP 8865 opposite last page.

## Distant-reading thermometer featured in bulletin

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Describing an electric thermometer for centralizing temperature indications, one-page bulletin suggests applications. Unit pictured has capacity of 50 circuits. Additional circuits can be added in units of ten. Temperature ranges are between —100 and 400°F.

Bul No. 1465 is issued by Illinois Testing Laboratories, Dept. CP, 420 N. La Salle, Chicago 10, Ill. Specify CP 8866 opposite last page.

# Physical, thermodynamic properties of 51 elements and compounds

Factors such as equilibrium conditions, heats of reaction, and resulting temperature changes must be considered in evaluation and selection of catalysts. 38-page booklet offers detailed data which can be used in evaluating the course of many chemical reactions. Enthalpies and heat capacities of 51 elements and compounds, and equilibrium constants for several reactions are included.

To obtain "Girdler Catalysts — Physical and Thermodynamic Properties of Elements and Compounds" write on letterhead direct to Catalyst Dept., The Girdler Co., Dept. CP, PO Box 987, Louisville 1, Ky.

#### Lists mechanical seals for pumps handling corrosive liquids

"Wedge lock" mechanical seals, used on pumps handling acids, caustics, solvents, and other liquids and slurries under a wide range of operating conditions, are covered in four-page data folder. Seals are interchangeable with stuffing-box packing.

Bul CP551 is issued by Chemical & Power Products, Inc., Dept. CP, 11 Broadway, New York 4, N.Y. Specify CP 8867 opposite last page.

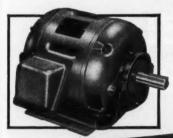


The Wagner line of polyphase, drip-proof general purpose motors—rerated to the new NEMA Standards—pack more power into smaller frames, but give you the same high Wagner Quality and long life performance that have made Wagner Motors "the choice of leaders in industry" for many, many years. These new Wagner Motors are fully protected in the ball bearing models. Their construction makes them completely drip-proof—and virtually splash-proof. The extra large, diagonally split conduit box makes wiring easy. Smaller size

and lighter weight means more economical handling and installation.

These new rerated Wagner Motors retain the features desired by plant engineers and maintenance men. They will operate for years without regreasing. But... when lubrication is necessary or desirable, you can lubricate these motors because they are provided with two lubrication openings.

Bulletin MU-202 gives full information—write for your copy today.



M55-6

# AVAILABLE WITH RESILIENT MOUNTING —SLEEVE BEARINGS UP THROUGH 5 HP.

These Wagner standard motors, in ratings up through 5 horsepower, can be used for specialized applications because they are available in sleeve bearing models with endplates that will take resilient mounts.

You can look to Wagner for a complete line of standard motors for specialized applications. The wide range of types and sizes permit the selection of a standard motor for almost any need.

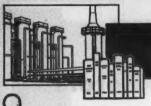


Wagner Electric Corporation
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BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

ELECTRIC MOTORS . TRANSFORMERS . INDUSTRIAL BRAKES . AUTOMOTIVE BRAKE SYSTEMS-AIR AND HYDRAULIC

When inquiring check CP 8868 opposite last page



# processing and engineering data

#### Glycol Data

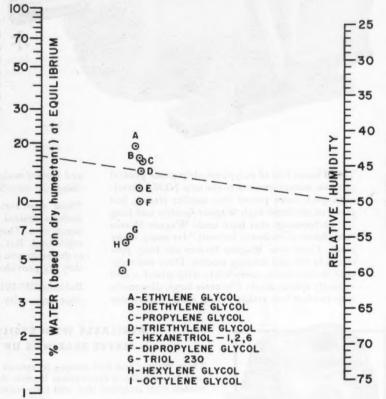
Information supplied by CARBIDE and CARBON CHEMICALS COMPANY A Division of Union Carbide and Carbon Corporation

Nomograph by BRUCE FADER, Associate Editor

In a 64-page data book, properties, uses and other special information pertaining to glycols is compiled. Nomograph presented here is based on data from this book. Among other data presented in the book: physical properties, shipping data, grades, specs and test methods, constant boiling mixtures, specific heat, thermal conductivity, and other properties.

Nomograph finds hygroscopicity for nine glycols at temperatures from 70 to 80°F. Broken line, for example, shows that with a relative humidity of 50 per cent, at room temperature, triethylene glycol in equilibrium will contain 17 per cent water (based on dry glycol weight).

"Glycols" is available from Carbide and Carbon Chemicals Co., Div. of Union Carbide and Carbon Corp., Dept. CP, 30 E. 42nd St., New York 17, N.Y. When inquiring specify CP 8869 on handy form opp. last page.





You can stay in the lead . . . with faster production, lower operating costs and improved product . . . through operation of "NATIONAL" Convoyer Dryers . . . the ultimate in modern Dryer design and efficiency, Pictured above: Upper, large Multiple-Unit, Multiple-Apron dryer; lower, fourteen-section Multiple-Unit Single-Apron machine.

**NEW "P-4" CONSTRUCTION** 

"P-4" Construction means a precision-built, prefabricated, trusstype structure, providing a new measure of strength, rigidity and durability. Advantages to the customer are obvious: Longer service life for the Dryer; smoother operation; freer access for cleaning and maintenance; and reduction of installation time in the customer's plant of as much as 50%. Another important feature of "P-4" Truss Type Construction is that the special method of attaching the panels meets all Underwriter's Codes covering explosion hazards.

IMPROVED HOUSING PANELS

The new insulated panels (Patented and Patents Pending) used for the housing are larger, stronger, more rigid, and, with their 4" insulation, provide greater protection against heat loss. They are of trussed-and-tensioned, non-through-metal construction and incorporate expansion-contraction compensation.

IMPROVED AIR DISTRIBUTION AND CONTROL

The exceptionally high drying speed of "NATIONAL" Dryers results from a combination of adjustable fan power and unique air distribution system, controlled to assure equal volume of air to the entire run. There is no "shading" — no uneven dry-ing. This arrangement permits drying at consistently higher speeds than those previously permissible. Patented Indexing Orifices, Turning Vanes and other devices and arrangements assure unequalled versatility and precision in air distribution and control.

SUPER-POWER FANS
"NATIONAL" has developed the adjustable-pitch principle into its axial-flow fans which provides far greater operating potential than heretofore used in any drying machinery. Greater speeds and volume of air can now be employed and adjusted to the specific requirements of the drying operation. The new fan construction includes special alloyed metals fabricated by an improved welding technique. The Fan mountings, insulation and lubricating systems have also been redesigned to provide improved smoothness of operation and virtually no maintenance. Other features of "NATIONAL" Conveyor Dryers include continuous hopper feeds; automatic leveler to conveyor belt; pressure extraction and heating for pre-drying.



Write for Complete Information

YING MACHINERY CO. EHIGH AVENUE and HANCOCK STREET PHILADELPHIA 33, PENNA.

New England Agent: JONES & HUNT, INC., Gloucester, Mass. Cable Address: "NADRYMA" — W. U. Code

When inquiring check CP 8870 opposite last page

AU

## Describes ultrasonic testers for thickness gaging

Presenting ultrasonic thickness testers for corrosion surveys and thickness measurements, sixpage bulletin explains principles of operation. Table summarizes operating characteristics. Materials and thicknesses measurable to  $\pm 3\%$  include steels from 0.015 inch to 12 inches. Suggested uses include corrosion surveys and thickness measurements of pressure vessels, piping, tanks, boiler tubes, hollow forgings, extrusions, and castings. Bul A2 is issued by Branson Instruments, Inc., Dept. CP, 430 Fairfield Ave., Stamford, Conn.

When inquiring check CP 8871 on handy form

Data on pelleted vanadia oxidation catalysts

opposite last page.

Single-page data sheet presents physical properties, activity information, and potential applications of Code 903 pelleted vanadia catalyst now used for air oxidation of naphthalene to phthalic anhydride.

"Code 903 Vanadia Oxidation Catalyst" is issued by Davison Chemical Co., Div. of W. R. Grace & Co., Dept. CP, 101 N. Charles St., Baltimore 3, Md. When inquiring specify CP 8872 on handy form opposite last page.

# Deals with high-pressure autoclaves, reactors

Line of high-pressure autoclaves, generators, reactors, and valves is described in illustrated two-page bulletin. Units range in size from 1 cc to 2 cu ft, withstanding pressures from zero to 60,000 psi, and temperatures from zero to 500°C. Bul 155 is issued by High Pressure Equipment Company, Dept. CP, 1222 Linden Avenue, Erie, Pa. Specify CP 8873 opposite last page.

## Discuss sheet steel with plate of electrodeposited Ni

Two-color folder gives advantages of Lectro-Clad nickel surfaces on steel. Applications for coatings up to 0.008" thick on 14 to 7 gage steel in sizes from 18 to 84" in width and 60 to 240" in length are listed.

"Lectro-Clad Nickel-plated Sheet Steel" is issued by Bart Manufacutring Corp., Dept. CP, 229 Main St., Belleville 9, N.J. When inquiring specify CP 8874 opposite last page.





The Class "Y" compressor offers everything a good compressor should have for heavy duty service: high overall efficiency, long life with minimum maintenance; smooth, quiet operation, accessibility and simplicity, compactness and ease of installation. With one-piece frame, it is shipped intact, including a flange-mounted motor—truly a "package" type unit. Built in sizes 75 to 250 H.P., it is available in single and multistage designs for pressures up to 5000 pounds, with belted, coupled or flange-mounted motor drive.

Simplate Valves, efficient and easy-to-clean shell-and-tube intercooler, multistep capacity regulation, roller main and precision type connecting rod bearings are some of the reasons for the big compressor performance of these medium size machines.

Wrife for Bulletin 766

# Chicago Pneumatic & Eust 44th Street, New York 17, N. Y.

PREUMATIC TOOLS . AIR COMPRESSORS . ELECTRIC TOOLS . DIESEL ENGINES . ROCK DRILLS . HYDRAULIC TOOLS . VACUUM PUMPS . AVIATION ACCESSORIES

When inquiring check CP 8875 opposite last page

AUGUST, 1955

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# Most versatile of all industrial fans



#### PROPELLAIR TYPE "CD" DIRECT CONNECTED FAN

Use this heavy-duty fan for ventilation . . . to exhaust heat, dust, moisture, fumes and smoke. It's powerful, dependable, efficient. Use it in ductwork, hoods, roof ventilators, wall mountings or for air circulation and cooling. Engineered to move a lot of air at low cost.

#### You get these important features:

- · Cast aluminum airfoil propeller for greater
- Dependable R & M All-Weather Motor direct connected for long, trouble-free service
- Venturi entrance ring with tip seal to create efficient air flow
- Rugged steel motor support arms welded to entrance ring
- Explosion-proof and glass-insulated motors available
- Fan and motor covered by a single Robbins & Myers guarantee





SPRINGFIELD . OHIO











When inquiring check CP 8876 opposite last page

#### **NEW LITERATURE**

#### Silver-catalyzed persulfate splits glycols

Glycol splitting agent, silver-catalyzed persulfate, is characterized in six-page technical paper. Method yields glycol cleavage products, aldehydes, ketones, or both in yields ranging from 40 to 100%.

Bul 63 is issued by Becco Chemical Div., Food Machinery & Chemical Corp., Dept. CP, Station B, Buffalo 7, N.Y. When inquiring specify CP 8877 on handy form opposite last page.

#### Molybdenum - from oxide to finished product

Information on molybdenum's properties, processing, and product use are shown by text, tables, and graphs in 20-page illustrated brochure. Center panel is a flow chart showing how the metal is made - from oxide to finished product. Products of manufacturer are listed.

Bul NP-428 is issued by Sylvania Electric Products Inc., Dept. CP, 1740 Broadway, New York 19, N.Y. Specify CP 8878 opposite last page.

#### Describes millivolt pH meter accurate to 0.02 pH

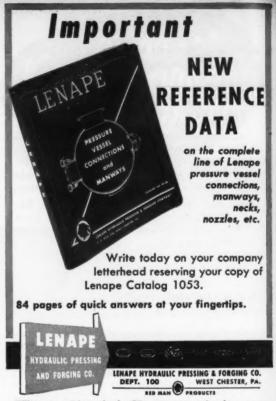
Featuring line-operated pH meter, three-page bulletin explains simplicity of operation. Indicating meter has seven-inch mirror scale, permitting readings to 0.02 pH unit from 0 to 14. Instrument has one-stage amplifier in exchangeable plug-in unit for simple maintenance. Other features mentioned include stabilization for line voltage variations, temperature control, small power consumption, suitability for Karl Fischer titrations, acid-base and redox titrations.

Bul 105 is issued by Photovolt Corp., Dept. CP, 95 Madison Ave., New York 16, N. Y. When inquiring specify CP 8879 opposite last page.

#### Complete line of counters listed in reference

Detailing eleven heavy-duty counters, four-page data sheet includes mechanically- and electricallyactuated units. Counters shown include mechanically-tripped and motor-driven types, ticket printers, automatic stoppers. Explosion-proof housings are described.

Tech Ref 54C can be obtained from Richardson Scale Co., Dept. CP, Van Houten Ave., Clifton, N.J. Specify CP 8880 opposite last page.

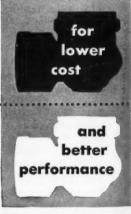


When inquiring check CP 8881 opposite last page

SPRAYING SYSTEMS CO.

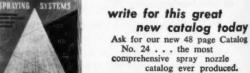


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age ING Over 750 household and automotive chemical specialties — including waxes, polishes, detergents, cleaners, shampoos, and deodorants — are analyzed in 1955 bulletin available at \$15.00 each from Chemical Specialties Research Laboratories, Dept. CP, PO Box 33, Ansonia Sta., New York 23, N.Y.

## Discusses difficult trace analyses for copper, Iron, manganese

Explaining how the central research division of a manufacturing corporation solved problem of making difficult determinations of trace elements, four-page data sheet discusses techniques of construction and use of working curves, interferences, and procedure for flame spectrophotometer.

Product analyzed had such slow solubility that concentrations and elements to be determined were too small for convenient handling by ordinary wet methods. Techniques described may be applicable to problems of similar nature. DU-24-A is issued by Beckman Div., Beckman Instruments, Inc., Dept. CP, Fullerton, Calif. Specify CP 8883 opposite last page.

#### Space-saving panel-meters

Engineering data sheet describes and gives performance data for series of side indicator panel meters. Meters described required panel area of 5.5 sq in as compared to 16.4 sq in for conventional 4½" round meter and 18.6 sq in for 4½" rectangular instrument.

Two-page sheet includes installation dimensions. Meters described have accuracy of  $\pm 2\%$  of full scale deflection on DC,  $\pm 5\%$  on AC. EDS Model 1145 is issued by International Instruments, Inc., Dept. CP, P. O. Box 2954, New Haven, 15, Conn. When inquiring specify CP 8884 on handy form opposite last page.

#### Paste pigments for vinyls

Description, advantages, and list of stir-in calibrated color pastes for vinyl plastisol compounding are presented in eight-page technical data bulletin #140, issued by Claremont Pigment Dispersion Corp., Dept. CP, 110 Wallabout St., Brooklyn 11, N.Y. When inquiring specify CP 8885 on handy form opposite last page.

# Specifying Hancock Bronze Valves means big savings in your valve investment

The economy of Hancock "500 Brinell" Bronze Valves has been proved by industry . . . in piping systems similar to yours. Users rate them No. 1 because Hancock Bronze Valves are built with quality materials and design features that save money on valve investment. Put one in the line and the demonstrated savings will lead you to specify Hancocks from then on.

Here's why they cut costs! Seat and disc are superhard "500 Brinell" stainless steel, formed for tight bottom seating under compression, without tension. No leaks! No wire drawing, galling, steam cutting! The rugged diaphragm is 125 to 230% stronger than in the usual bronze valve. Long-wearing silicon bronze is machined into a large diameter stem with Acme thread to assure straight-line rigidity and smooth operation. A practical back-seating design makes it easy to pack the Hancock Bronze Valve under pressure.

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In Canada: Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario

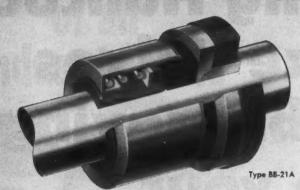
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MAKERS OF 'AMERICAN' INDUSTRIAL INSTRUMENTS, 'ASHCROFT' GAUGES, 'CONSOLIDATED' SAFETY AND RELIEF VALVES, 'AMERICAN-MICROSEN' INDUSTRIAL ELECTRONIC INSTRUMENTS, Stratford, Conn. 'CONSOLIDATED' SAFETY RELIEF VALVES, Tulsa, Okla. AIRCRAFT CONTROL PRODUCTS, Danbury, Conn. and Inglewood, Calif. "SHAW-BOX" AND 'LOAD LIFTER' CRANES, 'BUDGIT' AND 'LOAD LIFTER' HOISTS AND OTHER LIFTING SPECIALTIES, Muskegon, Mich.

When inquiring check CP 8886 opposite last page

# GARLOCK MECHANIPAK SEAL



for Rotating Pump Shafts at pressures up to 150 p.s.i.

COMPLETELY ASSEMBLED - READY TO INSTALL

The Garlock BB-21A Mechanipak Seal, proven in service on thousands of water pumps, provides a low cost *leakless* seal.

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This MECHANIPAK Seal occupies a very small space—specifically designed for rotary pump shafts. It comes completely assembled, ready to install. Standard construction includes brass shell, brass washer and Buna-N bellows. Other materials available. Furnished for shafts from \%" to 3" diameters.



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# GARLOCK

PACKINGS, GASKETS, OIL SEALS
MECHANICAL SEALS, RUBBER EXPANSION JOINTS

When inquiring check CP 8887 opposite last page

#### **EPOXY RESINS**

(Continued from page 11)

Because the word "epoxy" did not appear on any of the lists and papers governing high priority wartime projects, allocations for equipment were just not forthcoming. As a result, tests on production conditions had to be sandwiched in between regular runs of alkyds and other materials being made. This led to the creation of a slab of resin that is still a lab "mascot" at the laboratories in Louisville.

#### Toughness Demonstrated — Unfortunately!

Masters, Long and Scott put a production size batch to cook in the newest alkyd kettle. Since this kettle had more associated instruments and the latest in control features, it seemed best for the still-new product. Things did not turn out that way.

Two weeks after the batch was started, men were still working with portable power saws and air hammers taking fully polymerized epoxy out of that kettle. In a way, though, it was not all wasted effort. One large chunk of the yellowish-brown resin still rests on a table at the back of the lab. About every six months a slice is sawed off and tested — and test results are the same today as they were in 1945 when the noisy cleaning job was being finished.

#### Final Tests and Tricks

Through the years 1944-46 production conditions were found, formulations were perfected, and information about behavior of the resin was gathered. By 1947 the solid resin was under final tests and salesmen for the company were being shown what could be done with it. Two favorite tricks were developed.

One of these eye-popping stunts was to put a thick coat of resin on a 4 by 8" piece of glass. (Epoxy resins will cure completely even though the coat is 1/4 inch thick.) After the coating was cured, it was pulled off. Not much of a stunt — until you learn that epoxy adheres to glass better than glass does. In pulling off the coat, long splinters of glass pull off too, leaving the glass plate gouged out in graceful swirls that might have been made by a sculptor.

More direct, the other trick is not much easier to believe . . . at least on first seeing. Resin is poured into a round-bottomed two-liter flask until it has been filled well up into the neck. After polymerizing, the flask is broken off. A saw takes off the protruding "handle" formed by the neck and the form is ground down to make a ball just slightly smaller than a bowling ball. When the observer is told to bounce this ball on a concrete floor, he usually gets a queasy feeling that this is the fast way to make small pieces of plastic. But despite involuntary bracing and a little tightening of the stomach on the part of all but the lab personnel, the ball bounces with a solid "thunk" every time . . . and shows a 95% rebound.

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A TYPE FOR EVERY USE! FOR ALL PRESSURES! FOR ALL TEMPERATURES!



Standard & Double
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When inquiring check CP 8888 opposite last page

CHEMICAL PROCESSING

First company outside of Devoe and Raynolds to recognize the terrific potential of epoxies was Shell. Having worked closer to this project than any other outside organization, it was natural that they should have been among the first to be licensed. Shell had a big part in the early successful commercialization of the idea. Two other chemical leaders, Carbide and Carbon and Dow Chemical, have since taken licenses. There are a good many more reasons why solid epoxy resins will bear watching. They are probably the most versatile plastic materials ever developed. They can be reacted with or modified with other resins, esterified, molded, used as adhesive and for potting. Epoxy has excellent electrical properties. It will cure at any normally encountered temperature.

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#### Strength Yet Untapped

Because of its tremendous adhesion to glass, it is a natural for glass reinforced plastic. Though full advantage of the strength of such materials has not been felt yet, glass reinforced epoxy pipe for high pressure service is definitely in the wind. In tests, a pressure vessel of 3/8 inch glass reinforced epoxy was cycled between 6000 pounds per square inch and atmospheric pressure. Test was terminated in boredom with no failure. More dramatic was a test where such a pressure vessel was punctured with a bullet while holding 6000 psi. There was no shattering.

Despite reports like these, epoxy resins are still not big volume plastics. Relatively high cost precludes their use in some applications. Markets where they are firmly entrenched usually reflect properties so superior that no other material can compete. Beer can linings, where lack of taste and high flexibility count, or forming dies for automobile bodies are good examples of this. But "alloying" with other plastics and superior characteristics do show promise in bigvolume, low-cost uses.

#### **Production Should Boom**

There have been more than a dozen market surveys on epoxies. Despite the fact that they are independent of oneanother, results show that production of epoxy coatings will probably increase by a factor of four or five in the next five years. Indications are that solid forms will grow even faster.

Far from standing pat on this accomplishment, however, Mr. Dabney hints that research is even now working on materials just as important as the epoxies.

Having started with the paint business in 1919, Dabney knows that the days when research was part hard work but mostly luck are fast disappearing. "The men who developed epoxy resins," he says, "decided what they wanted and worked until they had it. There was no luck or accident involved. Research has become the lifeblood of our business . . . there are projects in our laboratories now which may open up still new avenues and hold still more surprises."

(Continued on next page)



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2 Gateway Center . Pittsburgh 22, Pa

#### (Continued from preceding page)

With 35 years of paint experience behind him, William Dabney has seen concepts in this field change and evolve more than once. He served in World War I as a 1st Lieutenant in the AEF. Determined to go into business when he returned, he chose paint. His determination to keep his company up-to-date made him insist on adequate technical personnel and a constant attempt to improve, search for and create new techniques. In a real sense, development of epoxy coatings and epoxy plastics was just as much his doing as it was of the men who wrote formulas, tested new resins and put these new products into production.

Despite the fact that Dabney has retired as president and board chairman (he remains a member of the board) of parent company Devoe & Raynolds he is almost as active as ever in the company. His retirement, he explains, leaves him a little more time for the other organizatons he helps to guide. Among them: two banks, a life insurance company, the American Printing House for the Blind. He is also a member of the executive committee of the Paint, Varnish and Lacquer Association.

The research effort behind the development of epoxies was certainly deliberate. Through the energy and skill of this team of men, we benefit in new materials . . . and new standards of excellence for those materials which further research will develop.

# Bulletin shows complete line of liquid-level gages

Two-color bulletin illustrates liquid and water level gages in 26 pages. Float, pressure, differential pressure, and bubbler models are described. Engineering data on choice of bulb and instument for given installation are outlined. Installation information on liquid-level telemetering and remote control is included.

Bul L701 is issued by The Bristol Company, Dept. CP, 127 Bristol Rd., Waterbury 20, Conn. When inquiring specify CP 8891 opposite last page.

## Offers latest laboratory findings on lacquers and plasticizers

Forty-page bulletin gives latest lab findings on lacquers and lacquer plasticizers. Specs, properties, formulations, applications, and finishing schedules are covered.

Bul 76-A is issued by Archer-Daniels-Midland Co., Dept. CP, 700 Investors Bldg., Minneapolis 2, Minn. Specify CP 8892 opposite last page.



# HIGH PRESSURE VESSELS

• Whether you want conventional highpressure units or something special—send us your inquiries. COLE can build you the kind of high-pressure tanks or vessels you require—any size, any shape, any metal. Our experience of a century (we were established in 1854) in the design and fabrication of metal tanks may be of help to you.

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CHEMICAL PROCESSING



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IPES

Write to these addresses for more information on conventions and exhibits listed on page 5 of this issue.

American Assn. of Textile Chemists & Colorists. Lowell Textile Institute, Lowell, Mass.

American Chemical Society, 1155 Sixteenth St., N.W., Washington 6, D.C.

American Institute of Chemical Engineers, 25 W. 45th St., New York, N.Y.

Assn. of Consulting Chemists & Chemical Engineers, 50 E. 41st St., New York 17, N.Y.

The Chemical Market Research Assn., 27 William St., New York 5, N.Y. Mr. Robert Henderson.

Commercial Chemical Development Assn., c/o N. B. Sommer, American Cyanamid Co., 30 Rockefeller Plaza, New York 17, N.Y.

The Electrochemical Society, 235 W. 102nd St., New York 25, N.Y. Henry B. Linford, Sec'y.

25th Exposition of Chemical Industries, c/o International Expositions Co., 480 Lexington Ave., New York, N.Y. Mr. Earl Stevens Pres.

Federation of Paint & Varnish Production Clubs, 1524 Chestnut St., Philadelphia 2, Pa. Newell P. Beckwith, Pres.

Instrument Society of America, 10th Annual Exhibit, Exhibit Manager's Office, 3443 S. Hill St., Los Angeles 7,

Massachusetts Institute of Technology, Cambridge 39, Mass. Prof. E. H. Huntress, Dir. of Summer Session, '55.

National Paint, Varnish, & Lacquer Assn., 1500 Rhode Island Ave., Washington 5, D.C.

43rd National Safety Congress, c/o National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill. R. L. Forney, Gen-

20th Paint Industries Show - Contact Federation of Paint & Varnish Production Clubs.

Production Engineering Show, c/o Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N.Y.

Society of Industrial Packaging & Materials Handling Engineers, 111 W. Jackson Blvd., Chicago 4, Ill.

Technical Assn. of The Pulp and Paper Industry, Sixth TAPPI Testing Conference, 1878 E. 18th St., Cleveland 18, Ohio. Wm. Schoenberg, Exhibition Chm.

Western Electronic Show & Convention, 344 N. La Brea Ave., Los Angeles 36, Calif. Herbert Cerwin, Publ. Dir.



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kind in the world. For further information write Johns-Manville, Box 60, New York 16, N. Y. In Canada, 199 Bay St., Toronto 1, Ont.



\*Celite is Johns-Manville's registered Trade Mark for its diatomaceous silica products.



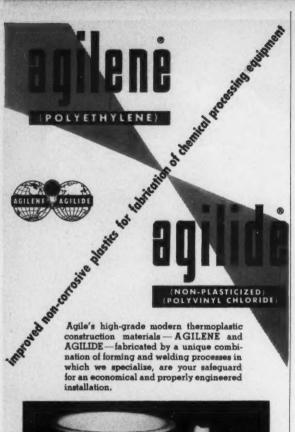
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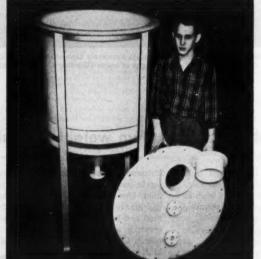
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**Prints** 

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Pictured above is an AGILENE self supporting tank for extremely corrosive hydrofluoric-nitric acid mixtures. This tank is 30" diameter by 40" high, complete with bolt-on cover, inlet and outlet nozzles, and AGILENE globe valves.

AGILENE (polyethylene) rigid, special structural grade, is the outstanding material of construction for the Chemical

Processing Industries.



When inquiring check CP 8896 opposite last page

## discussed in this issue PROCESSES, EQUIPMENT, and MATERIALS

Use this "quick-locator" when you want information on a specific type of process, equipment or material mentioned in the processing stories or the advertisements in this magazine. Everything discussed in this issue is given here, if you want more data you can write manufacturer direct . . . or turn to inside back cover and use the handy "Information Request Slip." This is a special service provided by the publisher . . . no obligation or charge, of course. The publisher contacts the proper manufacturers for you-information comes to you direct.

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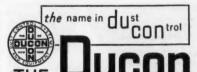


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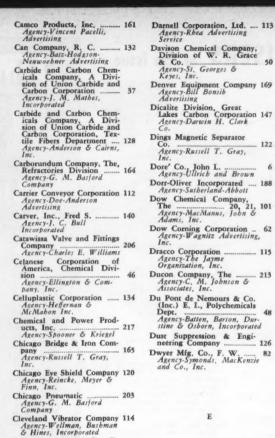
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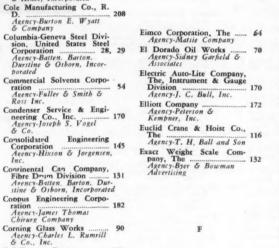
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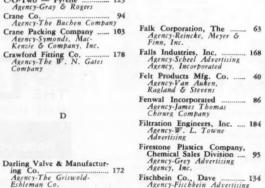
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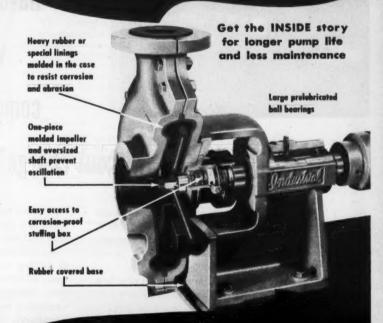
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#### 'Tisn't so . . .

... no, 'tisn't so. With the exception of a few general magazines (e.g. READER'S DIGEST\*) that sell hundreds of thousands—some millions of copies—most industrial publishers with relatively small circulations actually lose money on their subscription sales.

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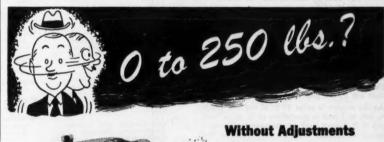
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(Continued from page 2)

#### Pre-historic animal hairs screened from clay

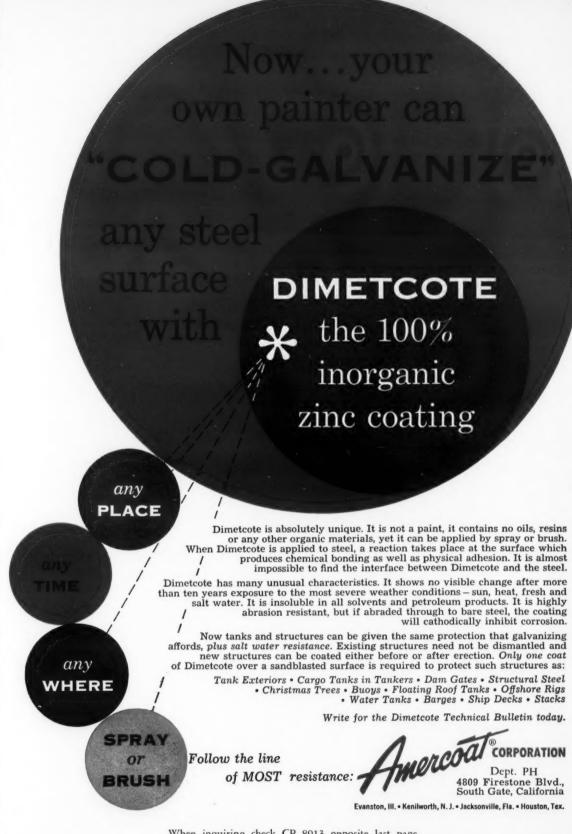
Fibers, tentatively identified as hair from pre-historic animals, are being caught on extra-fine screens and in trapping devices used to filter clay at the Ohio Brass Company's Barberton plant. These fibers had been causing trouble, and, while company officials smile and suggest that prehistoric red mastodons may be the ancestors of today's pink elephants, they're pleased at having screened out a source of headaches in their clay quality control procedure.

#### A fish by any other name wouldn't make a candle

Seems logical that the candlefish would have something to do with candles. But to the Salish Indians of Alaska (a literal-minded tribe evidently) the candlefish is a candle. They draw a piece of cypress bark, which serves as a wick, through its body. The fat, finny creature burns like tallow when the wick is lighted. (Dyelines and Bylines.)

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